

BULLETIN OF THE EXTENSION DIVISION, INDIANA UNIVERSITY

Vol. VII

BLOOMINGTON, INDIANA

No. 12



Ninth Conference on Educational Measurements

AUGUST, 1922

Entered as second-class mail matter, October 15, 1915, at the post-office at Bloomington, Indiana, under the Act of August 24, 1912. Published monthly by Indiana University, from the University Office, Bloomington, Indiana.

**For Sale by the University Bookstore, Bloomington, Ind.
Price 50 cents**

A limited number of copies of this bulletin will be distributed free of charge to citizens of Indiana.

NINTH ANNUAL CONFERENCE
ON
EDUCATIONAL
MEASUREMENTS



Held at Indiana University, Bloomington, Ind., Friday
and Saturday, April 21 and 22, 1922

PUBLISHED BY
THE EXTENSION DIVISION OF INDIANA UNIVERSITY

1922

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Address of Welcome

WILLIAM LOWE BRYAN, *President of Indiana University*

IN welcoming you to the annual conference on educational measurements, I wish to express my pleasure in the rapid progress which this movement is making not only in the extent of its influence but in the quality of the work done. Only those who are ignorant of the work which is now done can fail to recognize its increasing importance and necessity. I wish especially to recognize the importance of the study of *cases*, as, for example, those which have been made by Terman and others. One remembers that the French physicians who developed the field of pathological psychology founded their work upon elaborate many-sided studies of individual cases. This is in accordance with the best practice of physicians. The best physicians do not rely upon one or upon a few diagnostic tests. They study many individuals with the utmost thoroughness by the diagnostic methods which have proved themselves in many cases. In hospitals the whole staff of experts combine to study an individual from the standpoint of their several specialties. It is to be noted that in the best diagnostic work dependence is placed not only upon the exact laboratory tests but also upon a broad observation of symptoms. In a word, medicine at its best unites laboratory technique with common sense judgments.

I observe with pleasure the disposition of some of our best and most mature psychologists to adopt these methods.

Segregation of Exceptional Children

HENRY H. GODDARD, *Director of the Bureau of Juvenile Research,
Columbus, Ohio*

ONE million seven hundred thousand men in the army were tested as to their mental level; these were fairly representative of the population, therefore the proportions discovered are applicable to the general population and also to the school population. From this we know that we have in our schools pupils of widely diversified capacity. Ten per cent of the army were found to have a mental level of 10 years or less; another 15 per cent have the mentality of about 11; 20 per cent of 12; 25 per cent of 13 and 14; $16\frac{1}{2}$ per cent of 15; 9 per cent of 16 and 17; and $4\frac{1}{2}$ per cent 18 and 19. If we consider the middle 50 per cent as normal average children then we should count 25 per cent subnormal and 25 per cent supernormal. It would be reasonable to suppose that both these groups should have special opportunities in the public schools. Of the higher group we may suppose that the $4\frac{1}{2}$ per cent are the brilliant children, and the 9 per cent are very bright. Together they constitute the college and university group. The $16\frac{1}{2}$ per cent constitute the high school group, as the army reports that the middle group of 25 per cent could not do high school work.

The reasons for the segregation of these various groups are many and we shall by no means exhaust the subject in this talk. Our present public school curriculum is of necessity adapted to the average pupil, and every teacher knows that there are children who are so bright that they are compelled to mark time, whereas at the other end is the group that is so dull and slow that it is inevitable that the teacher gives to them an inordinate amount of her time, and in spite of that has very poor success with them. As a matter of fact, experience has shown that in the past we have given these dull pupils practically nothing that was of any value to them or helped them in their exceptionally difficult struggles for existence after school age.

We are beginning to use educational tests now so that we have standards and can tell whether children are doing their work properly or not. We are no longer dependent on the old-fashioned examination which was so much a matter of the teacher's temperament, fatigue, or indigestion. But these new results show us that we have another problem besides that of the feeble-minded.

Let us assume for the sake of argument that 1 per cent of the children who enter school cannot do even first grade work; the other 99 are capable of doing it. The figures that I have already given show us conclusively that of that 99 per cent about 9 per cent are going to get somewhere about the fifth grade, and then they will have reached

the limit of their capacity. Fifteen per cent more are going to get thru the sixth grade; 20 per cent are going to get thru the seventh grade, and 25 per cent more will have reached their limit when they finish the grammar school, and so on. The first question that arises is whether the child who is never going to get beyond the fifth grade should have the same course thruout those five grades as the child who is going to finish the eighth, or the one who is going to finish high school, or those who are going to college. Whatever might be our conclusion in regard to those who are going to stop at the fifth as compared with those who will finish the eighth, we are not likely, I think, to disagree that the child who is limited to the fifth grade should not have the same work as the child who has the capacity to finish college. To a greater or less degree (the amount we need not discuss at the present time) it is necessary to have a much more extensive segregation than school men have ever dreamed of. Below all these who are capable of doing first grade work or over, the 1 per cent who cannot do first grade work has to be in school, at least the most of them, and should be receiving something that will be of benefit to them.

I have spoken so far of reasons for segregation from the standpoint of the pupil and his education. From the standpoint of the teacher and the schools the argument is equally strong. For many years we have been proud of our graded schools, and we have proved conclusively that better work is done all round and more satisfaction achieved from having first year pupils together, second year pupils in another group, and so on. But we are now realizing that the teacher who has forty or eighty first year pupils has, when you consider the intellectual capacity, as wide a range as ever the country school teacher had. Surveys have shown and will show that in any room in any school the capacity of the pupils in said room will range from three grades below the average to three grades above, and sometimes much more than that.

If the teacher has a feeble-minded child in her room and is asked how many normal children she will take if that one is removed the answer varies from three to six. Some teachers will say that they would rather have a dozen normal children than one defective.

It is a common remark that "If all were as bright as John or Jenny, teaching would be a delight." It seems to be equally true, tho not so quickly appreciated, that "If all were as dull as Jack or Jill, teaching would also be pleasurable." It is the mixture of *unequal* intelligences with the impossibility of adapting the work of the room all at once that makes the difficulty for the teacher. In justification of this seeming absurdity I have only to point to the teachers of special classes in the public schools or the teachers of children in the institutions for the feeble-minded, all of whom assert that they enjoy their work, and the vast majority would not even go back to the teaching of normal children. The point is that if the children are all of the same grade, whether that grade be considered bright or dull, it is possible to adapt work to them, to help them, to see them make progress, and to get all the joys and thrills that a teacher ever gets.

Time will permit us to consider only one other aspect of the question: the reason for segregation from the standpoint of social efficiency.

It is conceivable that builders might divide their work into buildings of brick, buildings of stone, buildings of wood, and so forth. But it is pretty clear that such a classification which ended here would be inadequate and such builders would not be public benefactors; would not be conducing to the health, happiness, and prosperity of the people. The man whose only question was, "Are these bricks?" might build a house of bricks so soft that they would not hold up; or bricks of such a color that they offended our aesthetic sense, and so on. The builder who did not select his bricks for quality, using poor cheap bricks where it was suitable and fine expensive bricks where it was necessary, would not be accepted as an intelligent builder. It is the man who selects his material and adapts it to the use expected of it, who builds prominent buildings out of suitable material, that is the real contributor to human welfare. The man who should build a state capitol or a museum out of material that would crumble to pieces in a few years would be highly censured. Similarly the educator who takes a boy who could be made a good window-washer and wastes his time by trying to make a college president of him is not a public benefactor and does not contribute to the welfare of society. Society has a right to demand, and it is perhaps not too much to predict that in the near future it will demand, that we in the schools select and classify our material and make the best possible out of each kind.

Methods of Selecting Children for the Special Class

HENRY H. GODDARD

IN organizing the special class, it is important to have clearly in mind the purpose in view. If, for example, your purpose is to relieve the teachers of normal children from their worst and most troublesome cases, the children can be picked out by observation. Any teacher will nominate one or more from her room whom she will be glad to get rid of. Some object to this procedure; they say that these worst cases belong in an institution and should not be taken out of the regular class until they can be transferred to an institution for the feeble-minded. Moreover, when put into a special class the teachers of such classes become discouraged and the work lags. Some think that we should take out of the regular classes only those children who are backward but improvable, then the teacher of the special class sees results, and things go satisfactorily. Such views, I believe, result from a misunderstanding and failure to lay out the program definitely.

The special class made up of low grade defectives will be discouraging to the teacher and probably result in her resignation if the superintendent or principal in the case demands that such a class be brought to grade. Such a requirement sounds absurd and yet such demands have been made in the past. The principals, not understanding the situation, think that extra facilities, small groups, and special effort will make it possible to bring these children up to grade. Nowadays principals are better informed, and few, if any, ever make such demands. Of course the only thing to be asked of such teachers is that she make these children first of all happy; secondly, as useful as their limited capacity will permit.

It is usually necessary to pay a bonus to teachers of the special class, which bonus does not appeal strongly to the teachers of the regular grade, unless it results in their being relieved of their troublesome cases. To go into a room and pick out four or five rather dull, backward children, but leave in it one or two imbeciles, does not usually win the co-operation of the regular teacher for the special class movement. And usually it is desirable to have all the coöperation possible with such a movement. If the teachers believe in it and find it helpful to them, they will speak a good word for it and will prevent any difficulty. For example, one of the very unfortunate things for such work is to have the new class styled the "crazy class" or the "nut class", a thing that is almost certain to happen, if in the process of the establishment somebody is offended. And it is needless to say that it is almost certain to happen if there is no one in the special class except the very worst cases.

The outcome of this seems to be that some plan should be evolved whereby all these difficulties can be avoided. If one could go thru the schools and pick out all the children who need special classes and put them into special classes, the problem would be relatively easy. But

since that is not usually the way the work is done because it is usually necessary to start the matter in a relatively small way, we shall have to look for something else. A possible solution lies in a geographical procedure; that is to say, suppose instead of picking out all the low grade cases in the entire school system the superintendent would decide to put a special class or classes into one school building. He can then do a thoro piece of work in that building. Take out first of all the children who seem to be capable of making progress and perhaps returning them to the grades. This will give character to the class and prevent it being called the "fool class". Then there can be put into it the lower and lower grades until you get down to the very poorest. After this work has started and has been running until the novelty of it has worn off, it will be entirely possible to subdivide quietly these into the low, the middle, and the high grade defectives or merely backward children.

Assuming then that some such plan is the one that we have decided upon and that our purpose is to pick out from the regular class all children who require special help, the question of the particular method is to be answered. In the first grade and at the beginning of school there is no efficient method except that of mental tests. Where a child shows a considerable degree of backwardness, this should be confirmed by family history and the child's pre-school history, and anything that may indicate that he is average or sub-average in his conduct and behavior and ability. Of course in cases of doubt the child should be put into the first grade and tested out by the regular work. In a month's time the teacher can tell whether a child is bright or dull. And so for the other grades the testimony of the teacher is of much value, altho it must always be carefully scrutinized because some teachers are deceived by their personal preferences or prejudices and sometimes fail to note the important points in such cases.

Non-promotion is adequate reason for segregating a child in a special class. A child that has been in a grade two years without a reasonable explanation for it should be regarded as defective and placed in a special class. I should do this even in doubtful cases, because the probabilities are that the child will make up his deficiency better in the special class than he will in the regular grades. In other words, it is a great deal more effective to be a bright boy in the backward class than to be a backward boy in the regular grade. The one makes for encouragement and enthusiasm and activity, and the other makes for discouragement and failure. Of course in the upper grades, as in the lower, family history and the child's own social, industrial, and school history should all be taken into account. Moreover, no statement of anybody should be taken at full value until verified. Prejudice is often strong and it works both ways. Not infrequently a teacher says, "Oh, he is feeble-minded, take him away", simply because she doesn't happen to get along with him. They are not compatible and he does not work for her. On the other hand, a teacher says, "Oh, this boy is normal", just because he is pretty and attractive and she likes him. Nor are teachers the only persons that make these mistakes; even the parents are oftentimes prejudiced and neighbors proverbially so.

Of all the factors, the mental tests, if they have been intelligently administered, are the most reliable.

Program for the Various Groups

HENRY H. GODDARD

IN taking up the question of program or kind of work for the various groups we have to consider two questions: First, whether we shall attempt to teach a child something that we know he cannot learn; second, whether, even if there is something that the child can learn but is never going to be able to use, we shall still teach it. These may sound ridiculous, but they are nevertheless things that we have been continually doing in the past. The problem of the moron, the high grade feeble-minded, is, in my judgment, the problem of education rather than a problem of eugenics. It is easy to say that the world would be better if we could cut off the lower levels of intelligence. But the more I think of that statement the more I wonder whether that is correct; whether there is not a place in the world for those people who have so little intelligence that they are willing to dig ditches and scrub floors and do other work that you and I do not want to do, and that we should not have to do since our value to society is in doing work that is much more important. If that is the case, then we must not eliminate the morons, but educate them. The reason we have thought that we had such a serious problem with the morons is because we have, up to the present time, failed to give them the kind of education that they could take. We have taken them into school with the other children and tried to make college presidents of them. We have kept them in school as many years as possible, and when they finally go out it is to face the world without the ability to do anything. We have wasted our time trying to teach them things that they could never learn or could never make use of and consequently they are always useless persons, therefore getting into trouble, and eventually landing either in the prison or the institution for the feeble-minded.

Our first proposition, then, is that those who cannot learn school work, academic work, book work, should be trained to do things with their hands that will enable them to become useful and at least partially self-supporting. It is a curious thing that we have approached this usually from the wrong end. I can remember when in the reports from a certain institution for the feeble-minded the authorities claimed with pride that their school department gave the children the same work that they got in the public school, but allowed them a longer time in which to accomplish it. In other words, the first concession to these defectives was to give them a little longer time. The next step was to give them a certain amount of manual training, and we have only gone a little beyond that at the present time. In most special classes for defectives in the public schools the idea is thought to be a half-day academic work, and a half-day manual training. In only one school system known

to me is there anything like real approach to the true situation. Miss Anderson, of Newark, N.J., says: "Let us forget the regular curriculum of the normal child and study our defective child and see what he needs, get down to where he lives." And as a result of such study and procedure she begins at the bottom and works up, rather than beginning at the top and reaching down.

Fortunately we have even with defectives something to build on, namely the instinct; and one of the instincts, or at least one of the fundamental joys of childhood, is to play in water. This may be turned to good account with these children, and the very low grades should be taught to wash their hands as they play in the water. They may next be taught to wash their faces, and then their bodies, and then to wash clothing, both their own and family clothing that they bring from home. This is to them largely playing in the water, and they are happy and useful.

Must I stop to discuss with somebody whether this is education? There are people, it is true, for whom nothing is education unless it be learned out of books. Such people are thoughtless and know very little psychology. The fact is that there is nothing in books that is education unless it has a concrete background which the individual may call upon at any time. This is the only education that children of this type can receive.

Another difficulty that will arise in some minds is whether there is anything educational in a process so simple as washing hands, or face, or clothing. In this connection it must be understood that these children have to be taught things that the normal child acquires without ever knowing that he is learning them. There is nothing too simple to have educational value if it requires an effort for them to learn it. We, therefore, begin with these low grade children with the very simplest of ordinary occupations, and we end where we find the limits of their intelligence. Some of them can learn only to do the things we have already mentioned. Others can learn to mend and sew; and the still higher grades can learn to make simple clothing or even to do the work of a tailor.

In directing occupational work, attention should be given to those things which will enable the child to earn a living or at least partially so. Most of the work now done in the special classes will not pass this test. No feeble-minded child can ever earn a living making furniture, or baskets, or embroidery. These things may be useful as recreation, and the feeble-minded child has just as much right to a certain amount of recreation of this sort, if he likes it, as has any adult. But in considering occupational work for backward and defective children we must take into account the fact that we are teaching them something by which they may earn a living.

We must realize that our purpose must be much simpler and more definite than with a normal child. With the latter we have as our creed the thought that we will give the child a broad training and general principles, so that when he leaves school he can adapt himself to almost any occupation that he finds advisable. But this program is utterly impossible with a defective. We must train him to a specific piece of work,

for he will never be able to do more than one or two things at best. With the lower grades who can only be trained to wash and scrub, to be assistant janitors, assistant cooks, etc., this problem is more easily handled. But when we get up the scale a little bit to those who want to do something different from that, we have to consider the particular occupation more closely. For example, a normal boy who has graduated from the eighth grade might go into a factory and ask for a job; the foreman would show him a machine and tell him that he would employ him to run that machine, and after a little instruction in the course of two or three days the boy would have mastered it and become a good employee. A feeble-minded boy of the same age and stature, with the same apparent promise, would go thru the same process, except that he would not learn to run the machine in two or three days, and at the end of the week the employer would say, "We cannot afford to bother with you." And so he loses the job. Now this is the place where the school should have come in. Knowing that there was or would be an opportunity for a boy on that machine, the school's problem should be to train the boy to run that particular machine. Whatever industry is carried on in a town where the boy lives should be examined for parts of the work which could be performed by such a boy, and then he should be definitely trained for it. There is no use to train boys in Indiana to do work making collars and cuffs; that work is done in Troy, N.Y.

The temptation is and probably will long continue to be to teach these children reading and writing regardless of whether they can profitably learn it or not. If this is to be done, and there are perhaps some cases that justify it, tho as a rule it is better left undone, whatever is to be done should be done thru the manual training work. Let the concrete manual industrial work come first, let the reading and writing be attached to that by encouraging the child, if he is able, to learn to write the name of his occupation, to learn to read the names of the wood or metals or materials involved, thus gradually leading out from the subject in which he is particularly interested. If he is able to do the academic work at all he will in this way master all that he is capable of, and master it in the easiest possible way. Moreover, if he cannot learn it in this way, he can never learn it in any way that would be of any advantage to him.

When our educational work is adjusted to the mentality of the child, along some such lines as here indicated, we shall find that we have fewer delinquents in our courts, and fewer morons in our institutions for the feeble-minded.

The Psychopathic Child

HENRY H. GODDARD

IT is not many years since we thought that insane persons were possessed of devils. Indeed, surprising as it may sound, there are still people living who have that belief. Of course all intelligent people now understand that insanity is a disease, and that in many cases it can be cured. If when I stepped on this platform I had complained that there were two desks instead of one, or began talking to somebody as tho he were standing on the platform when you could see that there was no one there, you would have diagnosed my case very promptly. You would not have called me a liar because I said there were two desks; you would not have called me feeble-minded because I was talking to a person that did not exist; but you would have said that I must be laboring under some kind of mental disturbance. And if I persisted in it you would not listen to me very long, but would proceed to take measures to have me cared for in a suitable way. These unusual actions are sufficiently peculiar to enable us to recognize the condition. But when a child does peculiar things, especially things that we do not want him to do, and especially again if he persists in doing those things in spite of reprimand and punishment, it seldom, if ever, occurs to us that he, too, may be laboring under some form of mental disturbance and needs care. On the contrary, we say right away that he is a bad boy and the case is settled, except if possible we punish him for his badness.

A few years ago we got a little light on this problem by discovering that there were such persons, high grade feeble-minded or morons, as we call them. This explained quite a good many of our troublesome cases. We observed them closely and perhaps tested them, and found that they had such low grade mentality that they were not responsible for what they did. But we were soon disappointed in finding that the theory of low grade mentality did not account for all of our troublesome cases. There were boys and girls that did wrong things who tested up to level, up to their age on mental tests, and in every way showed that they had good minds. So that the problem still remained: Why did they act as they did? It never occurred to us that they might have something analogous to insanity. They were clearly not insane, and to make any such statement would be absurd. But that by no means ruled out the possibility of their being not quite sound. A little leak in the dyke is not a break that floods the country, but nevertheless it is worth attending to. In short, we now know that the child brain may function badly just as certainly as the adult brain may become so thoroly disordered that it results in what we know as insanity.

The name that we have given to this condition in children is psychopathy, which means, literally, mentally suffering. It is not an entirely

satisfactory term, because the word is sometimes used of adults as practically synonymous with insane. But that is not a very common usage and will probably not interfere with our adaptation of the term. Such children are also called mentally unstable. The percentage of these children is unknown, but is probably quite large. At least enough is known of this condition now to make us strongly suspect that any child who persists in conduct that brings to him only punishment and disapproval and unhappiness is really psychopathic, just as we would conclude that any child who persistently ran into objects or who failed to see things that usually attract people must be blind, even tho his eyes looked normal. Nor are we presenting simply a theory, but we now have tests which as clearly demonstrate that the minds of these children are not functioning properly as your school tests show that the child has not done the work of the grade. And it is our experience at the Bureau of Juvenile Research that a large percentage of the delinquent children sent to us are suffering to a greater or less extent from this psychopathy; their minds do not function properly. Let us try to get a concept of what this means.

Let us suppose that when we leave here tonight I leave my watch on this stand, and tomorrow morning before anyone else is here a ten-year-old boy comes in; while walking around the room he sees the watch on the stand. What does the situation mean to him? First, that he has found a watch, he has no watch of his own, always wanted one, and here is one lying before him. In the second place, no one seems to claim it, he did not break into the room to get it; it is simply lying there on the table in a public room, no one claiming it, no name on it, and he has found it. But in the third place, the situation also means that a watch generally belongs to somebody, this watch is running, shows approximately the correct time, is therefore not a watch that has been thrown away. It is clear that somebody has forgotten it. It is customary in such cases to hunt for the owner, or if that is not feasible, to take the watch to the care-taker of the building, or to some person to whom application will likely be made by the person who had forgotten the watch, or even to advertise it in the paper. That may be called the total picture which many normal boys who have been reasonably instructed may be expected to see. But suppose instead of this kind of a boy another boy finds the watch, a boy whose mind is functioning so badly that the ideas expressed in our third paragraph do not come to his mind at all. The situation therefore means to him only that he has found a watch, he has long wanted a watch, and here is the opportunity to get it. He accordingly puts it in his pocket and walks away. We say he stole the watch. He did not steal the watch, he simply found a watch, and did the only thing that occurred to him to do—to take the watch. Some one says, "That may be a pretty theory, but there is no proof that it expresses the fact." It is true that we cannot tell what was in that boy's mind, but can we not recall similar states of mind in ourselves? They are due, probably not to mental disease, which cut off a part of the picture, but due to the fact that the mind has not yet developed to the point where the full picture was elaborated.

When I was probably seven years old a friend of the family who

was spending the night with us shared my room with me. In the morning he left the room before I was awake. When I opened my eyes I spied a watch on the table where he had left it. I jumped out of bed and seized the watch, and I can remember to this day the glow of satisfaction as I got it in my hand, with the firm conviction that I had a watch. The first thing that will occur to you is that I must have known that it belonged to the gentleman in question. It certainly did not belong to me and it had suddenly appeared there. But I give you my word that that idea never entered my mind. I suppose that I was so overcome with the joy and pleasure of having the watch in my hand that no question of to whom it belonged or how it got there ever came up. I simply had a watch and I was overcome with joy and delight. Further, when I heard someone coming I hid the watch. Now you will surely say that I was conscious of stealing the watch, for why should I hide it? Again, I assure you that I hid the watch not because I thought it belonged to someone else, but because it was mine and I wanted to keep it mine alone, and have the joy of it all to myself, not even to share its presence with someone else. The man had discovered that he had left his watch and came after it. When he found it was not there and I was still in the room, he immediately accused me of taking his watch. He asked me what I had done with it, and I did not tell him. I still had no thought of stealing the watch. As nearly as I can recall my feelings, I was surprised and disappointed to find that what I had thought was mine belonged to someone else. Before I could recover from my dazed state of mind the man had grabbed me and tried to make me hunt under the bed clothes for the watch. As soon as I could recover myself I got the watch and gave it to him.

I had of course failed to perceive the situation in its right light, but what was here due to immaturity I can easily believe is due in many cases to a mind that is somewhat out of adjustment, and functioning badly.

These children are the trouble-makers in our schools. Their wrongdoing may be along one or more of several different lines. They may be persistent thieves, or liars, or in the older cases guilty of sex perversions or excesses. Punishment does them no good. They will sometimes deny their acts even when caught red-handed: at other times they readily confess, are penitent, and promise faithfully that they will never do the thing again. They easily convince us because for the moment they are genuinely penitent, and mean what they say when they confess their conduct. But they are helpless. This impulse comes over them and they have no power of control. These children show many peculiarities, some of which are the following:

They are frequently more or less solitary; they do not get along well with other children of the same mental level; they are apt to prefer adults to people of their own age; their games may have a queer monotony which makes them seem peculiar even in their own family; they are especially apt to have strong likes and dislikes as regards food; they may be very destructive; they may have violent tempers; often have been recognized as different from the time they were babies; may be moody; they are not usually fond of other children; in school work they

are likely to be poor in those studies that involve memory; they are better in reasoning, a quality which often enables them to be very shrewd, cunning schemers of tricks and misdemeanors. They are usually difficult to handle in the grade work. Every schoolroom has one or more of them; they are the children on whom the teacher cannot rely, concerning whose misbehavior she is always worrying, for they are different and the regular punishments do not fit.

As to the cause of this psychopathic condition little is known. Our experience is that there are three groups: one group progresses to serious form of mental disease, and eventually may become insane; the second group remains rather constant, may grow up to become adults who are known as erratic or peculiar, sometimes more or less criminally inclined, but keeping just within the law; or possibly just getting into trouble; a third group seems to outgrow the condition. Some cases seem to be caused by overwork in school, or worrying over studies or other conditions. This type if rightly handled could apparently be cured and seemingly often is. The most hopeless group so far as we now know seems to be those that are due to congenital syphilis. This horrible scourge of syphilis in the parents seems to be transmitted to the children in a form that has perhaps at the time of birth destroyed the function of the higher nerve centers so that control, which is necessary to good conduct, is an impossibility with them. What is to be done with these children is a serious problem to which there is at present no answer.

The Technique of Diagnosing Individual Cases in Reading

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THE technique of diagnosing an individual case in reading includes all of the methods and devices which can be used by a skilful teacher in securing accurate detailed information concerning the difficulties encountered by a child, and their probable causes. As an introduction to the discussion of this problem the steps which were taken in the diagnosis of two cases will be reported in some detail. The first diagnosis was made by Superintendent French and Miss Johnson of Drumright, Okla. It was made as a regular part of their program of supervision. It is reported here in the form in which it was submitted with one exception; the tables showing the results of the tests are omitted:

This is the study of a boy in the third grade who is nine years and nine months old. His school attendance has been quite regular. He has never failed promotion, but has never done as good work as his teachers thought he was capable of doing. The boy was apparently of average intelligence, for he was responsive, able to meet new situations fairly satisfactorily, and capable of concentrating on whatever task was put before him. His health was good, except that at times he complained of his eyes. The school nurse and doctor said one eye was slightly defective, but not enough to handicap him in reading. The experimenters, however, are inclined to believe that the defect may be more serious and that the boy needs another examination by a specialist. How far this has affected his reading we at present are not able to say.

In order to justify our conclusions as to the subject's intelligence he was given the Stanford Revision of the Binet-Simon Intelligence Test. His intelligence quotient was 97. The tests, which involved reading ability, brought down the score.

The next step was to analyze the special reading difficulties, if there were such. The first test used for this purpose was Gray's Oral Reading Test.

The boy repeated often, was careless with endings, and often guessed at words from the context. The fact that most of the repetitions occurred at the beginning of the line led the experimenters to believe that habits of eye movements, especially those in making the return sweep, had not been firmly established. Later observations showed, however, that some of the repetitions were due to carelessness and inability to group properly. The tests also showed that the subject lacked in ability to attack new words. The test results showed that the subject is below the average.

Gray's Silent Reading Test was next given to ascertain how much of what was read was comprehended. By means of this test it was discovered that lip movement was very pronounced. As a result of this the boy was a word reader with very limited span of recognition. The results showed that in rate the pupil was decidedly below the standard for his grade, but in quality slightly above that for his class. This seemed to justify the conclusions that there were no special difficulties as to comprehension.

A short time previous to these tests the subject took with his class the Courtis Silent Reading Test, No. 2. The results differ somewhat from the results of the Gray test, for in this one the subject ranked below standard in both rate and comprehension.

The Haggerty Vocabulary Test was next given for the purpose of locating special phonetic difficulties, and also for the purpose of testing the subject's sight vocabulary. His percentage of errors on the phonetic words when first given was 28; after five weeks of individual attention it was decreased to 12. On the sight words the percentage of errors when first given was 26; after five weeks of work it was 13. These tests again indicated that the subject lacked in ability to attack new words.

The Binet-Simon Test for visual imagery and memory, also the one for that purpose in the National Intelligence Test, was used to discover any defects in these respects. The subject made a desirable score in each test.

In order to determine just how limited the subject's span of recognition was, short-exposure exercises were used. In spite of the fact that a tachistoscope was not available, the experimenter practiced exposing the cards until it could be done quite rapidly and at fairly regular intervals.

The special difficulties which were revealed in the foregoing diagnosis may be summarized briefly as follows:

1. Defective eye movements, especially in making the return sweep.
2. Limited span of recognition (word-reader).
3. Vocalization.
4. Inability to attack new words (phonetic difficulties).
5. Repetitions, due to carelessness, periods of confusion due to word difficulties, and inability to phrase properly.
6. As a result of the above special difficulties the subject was far below standard in rate.

The second illustration, which is included in this discussion, is a report of the diagnostic steps which were taken in the laboratory of the University of Chicago in the case of a boy who was failing in reading. Only those sections of the original report are quoted,¹ which contribute most to an understanding of the technique of diagnosis:

The subject of this study was a fourth-grade boy who was ten years and four months old when the investigation began. In September, 1920, he found it necessary to discontinue some of his school work because of inability to read fluently and effectively. This situation was so acute that fear was expressed by the father that the boy would have to discontinue school altogether.

Inquiry revealed the fact that the subject was a son of unusually intelligent parents, both of whom are constructive community leaders. The father was a successful professional man of independent means. The parents had purchased for the boy and his younger sister several hundred interesting and attractive books. Altho the girl had read widely, the boy had never taken the initiative in reading books independently. On the other hand, he had always enjoyed looking at pictures, and would listen very attentively if someone read to him.

The subject was normal physically in most respects and was very active and robust. Several years ago he experienced two attacks of pneumonia from which he fully recovered. At the age of four he began to wear glasses to correct the effects of astigmatism and myopia. He had worn them almost constantly since that time and had had his lenses changed at somewhat frequent intervals after careful examinations by an expert oculist. At the age of six his tonsils and adenoids were removed.

¹ William S. Gray, "The Diagnostic Study of an Individual Case in Reading", from the *Elementary School Journal*, Vol. XXI, No. 8, April, 1921.

The school history of the subject revealed facts which are both interesting and significant. At the age of four he entered a Montessori School, which he attended for approximately a year. Owing to the fact that he was subject to a chronic membranous infection he did not go to a kindergarten or to school between the ages of five and eight. During this period he received two hours of private instruction each day. Some attention was given to the rudiments of reading, writing, and arithmetic. The instruction in reading centered about formal exercises of the Beacon chart and primer.

He entered a public school at the age of eight. At the end of the second week he was promoted to the second grade because of his greater maturity and general superiority to first grade children. After three months he was promoted to the third grade, from which he was again promoted at the end of the year. In the first three grades he was able to compete successfully with his classmates because of his maturity, wide experience and general alertness, and because few demands were made on him for independent reading. When he entered the fourth grade, on the other hand, he encountered genuine difficulties because progress in the middle grades depends primarily on the ability of a pupil to read more or less independently, fluently and intelligently. Inasmuch as the subject had advanced very rapidly thru the primary grades, there were grounds for suspecting that the fundamental habits and associations on which fluent reading depends had never been adequately developed.

The first step in the laboratory diagnosis of this case included a measurement of the general intelligence of the subject. The Stanford Revision of the Binet-Simon Tests was used, and he scored slightly above the average of his age group. Had he not encountered unusual difficulties and confusion with those sections of the test which required reading he would doubtless have scored much higher. This satisfactory estimate of the subject's general ability was confirmed by his ready response to questions, his fluent speech, and his ability in all phases of school work which do not involve reading.

The second step in the laboratory diagnosis included a detailed study of the ability of the subject to read. In this connection three tests were used: the Standardized Oral Reading Test; Courtis Silent Reading Test No. 2; and the Burgess Scale for Measuring Silent Reading.

When the subject was given the oral reading test he made a score of 28.75, which is distinctly below the standard for the second grade. An analysis of the records secured during the test showed that he was unable to recognize many very simple words. In order to correct this defect, pupils are ordinarily given flash-card exercises, systematic instruction in word analysis, and numerous very simple reading exercises. He also made a large number of substitutions, such as *says* for *said*, *was* for *were*, *small* for *some*, *water* for *marble*, and *he* for *the boy*. In some cases this difficulty is overcome by directing attention to the content of a passage, in other cases by directing attention to the significant details of words. Furthermore, he recognized words individually rather than in groups, which resulted in an unusually slow rate of reading. Graded exercises for increasing the span of recognition have proved very helpful in this connection. The most characteristic difficulty revealed was a peculiar form of confusion, which led to frequent repetitions. In this connection he frequently pronounced words which appeared to the right before pronouncing those to the left. This error occurred so frequently that detailed consideration was given to it later in the investigation. The entire performance of the reader was similar to that of a first grade child who encounters serious difficulties in learning to read.

In the Burgess Scale for Measuring Silent Reading he completed two exercises in the assigned time, which gave him a score of 31 as a third grade pupil and 19 as a fourth grade pupil. Inasmuch as the median score for a grade is 50, it is evident that he did very poorly as compared with third and fourth grade children. In fact, when he was com-

pared with a group of second grade children, it was found that his score was distinctly below the median score of that group.

In the Courtis Silent Reading Test he read at the rate of thirty-five words per minute. Inasmuch as the standard rate for second grade children is eighty-four words per minute, it is evident that he encountered an unusual amount of difficulty with the mechanics of reading. In the second part of the Courtis Test he answered ten questions in five minutes and made a comprehension score of 90. In number of questions answered he again ranked distinctly below the second grade standard, which is sixteen questions in five minutes. In accuracy of interpretation he slightly excelled the fourth grade standard, which is 89. The results of the Courtis Test suggested that the major difficulty encountered by the subject related to the recognition of words, rather than their interpretation. Additional evidence supporting this conclusion was secured thru a supplementary test based on passages of the Courtis rate test. After the subject had read three passages silently, he was asked to reproduce what he had read. He succeeded in reproducing only sixteen words, or 12.5 per cent of the amount read. He then read three passages orally and made a percentage score of 18. Three passages were then read to him and he reproduced 70.1 per cent of the content. The distinctly superior comprehension score which was made when the subject was relieved of the problem of recognition made it clear that the fundamental difficulty which he encountered in reading related primarily to recognition rather than interpretation.

In the third phase of the laboratory diagnosis, attention was directed to a study of the causes of difficulty in recognition. In this connection four steps were taken: Jones's Vocabulary Test was given to determine the ability of the subject to pronounce sight and phonetic words; a visual memory test was given to determine whether or not the subject was noticeably inferior in ability to retain visual impressions; short-exposure exercises were given to determine his ability to recognize individual letters, the different letters of a word, and to recognize at one fixation a group of related words; and, finally photographic records of the subject's eye movements were secured in order to study deliberately and in detail characteristic difficulties which he encountered in reading.

In the Jones's Vocabulary Test he made a score of 77 on the phonetic list and 80 on the sight list. A careful study of his characteristic difficulties revealed the fact that he failed to see many letters unless his attention was directed to them, he confused the sounds of important letters, he was unable to analyze short words which contained the simplest phonetic elements, and he was unable to recognize at sight frequently recurring words such as *what*, *that*, *you*, *kite*, and *fire*.

The large amount of difficulty encountered in the recognition of words suggested the possibility of marked weakness in visual memory. Accordingly, the visual memory exercise of the National Intelligence Tests was given to the subject and to four fourth grade pupils of the University Elementary School who ranked distinctly above the average in general intelligence, school marks, and oral reading accomplishment. Pupil A, the special subject of this study, made only one error. The other pupils made one, two, or three errors. The results of this test indicated clearly that very little, if any, explanation for slow progress on the part of the subject could be attributed to gross defects in visual memory.

Attention was next directed to a study of the ability of the subject to recognize individual letters, parts of words, and groups of words at single fixations of the eye. The materials which were used included the twenty-six letters of the alphabet, eighteen two-letter words and ten of each of the following: two-letter nonsense syllables, three-letter words, three-letter nonsense syllables, four-letter words, four-letter nonsense syllables, two-word phrases, and three-word sentences. The separate items were presented uniformly thru the use of a drop tachistoscope. Each item was presented until it was accurately recognized. The four

fourth grade pupils who took the visual memory test took this series of tests also.

The records of the five subjects revealed some interesting and significant facts. Subject A made more than twice as many errors as any other subject. He recognized isolated letters, two-letter words, and two-letter nonsense syllables as accurately as the other subjects. His difficulties increased noticeably with the three-letter units. The numerous errors made in recognizing three and four-letter nonsense syllables indicate marked inferiority in the accurate recognition of the details of a group of letters. Until this handicap is removed a child encounters serious difficulty in securing a sufficient number of cues from one scrutiny of a word to enable him to pronounce it accurately. The large numbers of errors which were made in recognizing three- and four-letter words, and in recognizing two- and three-word phrases and sentences indicated that his span of recognition was much narrower than that of the other subjects. Until a child has attained ability to recognize two or more words at each fixation of the eye his reading is necessarily slow and ineffective.

Before drawing final conclusions a photographic record was secured of his eye-movements while reading a simple, unfamiliar passage. An analysis of this record gives striking support to many of the tentative conclusions which have already been mentioned. (1) The subject recognized each word individually. This is indicated by the fact that there is at least one fixation and in some cases several fixations per word. (2) The fixations were very irregular and unsystematic. This indicates that he did not have a definite method of extricating himself from a word difficulty or a period of confusion. (3) He had acquired inaccurate, uneconomical habits in making the return sweep from the end of one line to the beginning of the next. It is evident that this ineffective motor habit was at least a partial explanation for some of the confusion which he encountered in oral reading. (4) He had not developed well coordinated eye-movements, characteristic of effective readers. Instead of beginning at the left and going forward step by step, the eye skipped about, sometimes fixating on a point very much ahead of where it should be and at other times moving to the left over parts which had already been read. A partial explanation for this irregularity is found in a statement made by the subject. He stated that in reading a sentence he tried to find a sufficient number of words which he knew to enable him to guess at the meaning of the rest. This resulted in irregular wandering movements rather than definite progressive movements and made fluent reading more or less impossible.

The diagnosis which has been reported thus far led to the following conclusions: The subject, a fourth grade boy, ranked below the standard for second grade pupils in oral reading accomplishment. He was unable to recognize many simple words at sight and to analyze new words effectively, failed to note important parts of many words, and had never learned to recognize words in groups or thought units. He read very slowly both orally and silently, and made low comprehension scores as a result of the mechanical difficulties which he encountered. The photographic record of his eye-movements showed clearly that he had acquired uneconomical methods of making the return sweep from the end of one line to the beginning of the next, that irregular wandering movements characterized his progress from left to right, and that periods of confusion were experienced in recognizing many simple words.

The tests revealed no deficiency in general intelligence, visual memory, or ability to assimilate the content of a passage. This led to the conclusion that the subject had failed to develop a sufficient mastery of the rudiments of reading to enable him to read fluently and effectively. Rapid promotion thru the primary grades had doubtless resulted in the omission of types of training which were fundamental and important. The five outstanding defects revealed by the diagnosis were (a) inappropriate motor habits in making the return sweep, (b) irregular pro-

gression of attention from left to right, (c) failure or inability to scrutinize words in sufficient detail to recognize significant parts, (d) inability to analyze new words, and (e) inability to recognize words in groups or thought units.

The two diagnostic studies which have been presented describe in detail some of the methods which are employed in determining the difficulties which pupils encounter in reading. For the purpose of practical school procedure the various steps in a complete diagnosis may be summarized as follows:

1. A study of the child's history should be made at the beginning to secure facts which may aid in determining the kinds of difficulties which he encounters. Later these facts may be used in explaining difficulties which are encountered in the tests or in classroom exercises. Facts concerning a pupil's previous work may be secured from school records, teachers, and parents.

2. A preliminary diagnosis should be made of the pupil's accomplishments thru the use of standardized tests. The results should be analyzed carefully to determine in which phases of reading he encounters most serious difficulties. As was suggested in the previous lecture, it is helpful to determine the general type of remedial case to which a pupil belongs before undertaking additional diagnostic steps.

3. After the preliminary diagnosis has been completed it is usually necessary to continue the investigation thru the use of informal tests. This step is necessary because standardized tests frequently fail to provide sufficient information to insure an accurate diagnosis. Before the specific nature of a child's difficulties can be accurately determined it frequently becomes necessary to observe his classroom work, to secure detailed information from his teachers concerning his reading errors, and to make use of the child's own introspections and comments.

As soon as a pupil has been selected for detailed study, either because he is failing in class work or because he ranks low in reading tests, an effort should be made to secure detailed facts concerning his past history. In order to systematize this part of a diagnostic study, a blank was recently prepared containing a hundred or more items. The main headings of the blank were: Home Conditions; Physical History and Conditions; Mental Characteristics; Temperament, and Play Activities; School History; Reading History; and Present Status in Reading.

The points which proved to be most valuable under "Home Conditions" were (a) nationality of parents, (b) language most used in the home, (c) attitude of parents toward child, and (d) home provisions for reading and conversation. Under "Physical History and Condition" information concerning (a) general physical conditions, (b) nutrition, and (c) visual, auditory, and speech defects proved to be very helpful. Under "Mental Characteristics, Temperament, and Play Activities" the teacher's answers to the following questions were usually very suggestive: Is the child timid or aggressive, industrious or lazy, careful or careless, independent or dependent, coöperative or individualistic? How and where is time before and after school usually spent? The remainder of the outline is reproduced below, as it was used with the exception that the spaces for writing are not included.

SCHOOL HISTORY

Other than Reading

1. Pedagogical index. *a.* Grade now in?
2. Grade or grades "skipped"? Why?
3. Did pupil ever fail promotion? Why?

GRADE	School attended	Kind: city, country, public, parochial, private	Age at entering	Number of years in grade	Descriptive statements concerning quality of work
Kindergarten.					
First					
Second					
Third					
Fourth					
Fifth					
Sixth					
Seventh...					

4. Average grade or mark given thus far this year in each subject taken by the pupil

SUBJECTS	GRADE	OTHER SUBJECTS	GRADE
Reading			
Spelling			
Language or Grammar			
Writing			
History			
Geography			

5. Is slow progress in any subject due to difficulties in reading? (Comment in detail.)
6. Has attendance been regular? Causes of irregularity and amount?
7. Attitude of
 - (a) Pupil to teacher?
 - (b) Pupil to school?
8. Does child use library? How much?
9. Additional facts concerning school work other than reading which might explain cause of slow progress in reading?

Reading History

1. Before the child entered school, were the conditions in the home such as to stimulate an interest in books and a desire to read?
 - (a) Was instruction attempted?
 - (b) Amount and character?
 - (c) Success?
2. Was instruction in reading given in the kindergarten?
 - (a) Amount?
 - (b) Character?

3. Type of instruction in primary grades?
 - (a) Basic method used, if any?
 - (b) Was reading for content stressed?
 - (1) Did he acquire habits of intelligent reading?
 - (c) Was instruction given in phonetics and word analysis?
 - (1) Did he become an independent, fluent reader?
 - (d) Extent of opportunities for supplementary or library reading?
 - (1) Amount of voluntary reading?
 - (2) Kinds of selections chosen?
4. Character of instruction in grades IV, V, and VI?
5. Has reading development been fluctuating or uniform?
 - (a) When was difficulty first noticed?
 - (b) Nature of difficulty?
6. Has he ever had remedial work?
 - (a) When? Purpose?
 - (b) How long continued?
 - (c) Methods employed?
 - (d) Results?
7. Additional facts in reading history which might explain present difficulties in reading?

Present Status in Reading

1. Oral (Answer the following questions in detail.)
 - (a) In what phases does he excel?
 - (b) What are his characteristic weaknesses?
2. Silent (Answer the following questions in detail.)
 - (a) In what phases does he excel?
 - (b) What are his characteristic weaknesses?
3. What reading difficulties, if any, are evidenced in content subjects, such as history, geography, science?
4. What are the amount and character of the pupil's outside or supplementary reading?
5. Probable causes of reading difficulties:
 - (a) Does he express himself in English as well as the average pupils in his grade?
If not, in what way is he deficient?
 - (b) Is his vocabulary adequate?
 - (1) Speaking?
 - (2) Listening?
 - (c) Are his experiences adequate for the comprehension of what he needs?
 - (d) Additional significant causes?
6. Special interests of pupil which may be used in overcoming reading difficulties.
 - (a) In school subjects?
 - (b) Outside activities?
7. Additional facts of significance?

The preliminary diagnosis of a case should be made thru the use of several standardized tests. Two purposes should be prominent in the mind of the teacher who gives the tests: (a) to determine the phases of reading in which the pupil is relatively strong or weak; and (b) to determine the extent of his weaknesses by comparing his scores with the standard scores for his grade. In order to secure information concerning

all of the more important phases of reading, several tests should be used. The following have been employed to distinct advantage in the preliminary diagnosis of a number of individual cases: the Courtis Silent Reading Test, No. 2; the Burgess Scale for Measuring Ability in Silent Reading; the Thorndike-McCall Silent Reading Test; the Monroe Silent Reading Test; the Haggerty Reading Examination, Sigma I, and the Gray Oral Reading Test. The reason for including three comprehension tests is found in the fact that pupils who are poor in comprehension may score high in a particular test. Therefore, information secured thru several tests insures a more accurate diagnosis than if use is made of only one test.

The most important step in the preliminary diagnosis consists of the accurate interpretation of the facts secured thru the use of the tests. In the cases which were reported at the beginning of this discussion, there were numerous illustrations of careful interpretations of data. This cannot be done effectively by an inexperienced teacher or by one who is not thoroly familiar with reading problems. For this reason it seems advisable to delegate the diagnosis of the most difficult cases to teachers who are eminently qualified for the work. In some studies, which were made in Toledo recently, a group of supervisors went from building to building for a week making careful studies of three poor readers in each school. If the classroom teacher has had considerable experience it is advisable to let her make the diagnosis. She is the one who will doubtless give the remedial instruction, and she should have the benefit of all the information about the child which comes thru giving the tests and interpreting the results.

The preliminary diagnosis frequently fails to reveal the exact nature of a pupil's difficulty. It is advisable in such cases to continue the investigation thru the use of other tests. If a pupil encounters difficulties in recognition, Jones's Vocabulary Test, or sections of it, can be used to determine the kinds of errors which a pupil makes in recognizing words. If he misses a large number of the phonetic words, it is frequently advisable to ask him to name other words which begin with a given initial consonant or a so-called family ending. Pupils who are unable to name appropriate words frequently have never had training in the fundamentals of phonetics or need ear training.

If a pupil reads slowly and haltingly, it is frequently advisable to determine his span of recognition. This can be done by pasting on cards simple words and phrases of various lengths. In giving the test each card should be exposed for about a second and a record made of the number of exposures which are required for accurate recognition. Inasmuch as no standards exist at the present time, it will be necessary to give the same test to satisfactory readers in the same grade. A comparison of the records will show whether or not the diagnostic case needs short-exposure exercise.

It is frequently necessary to supplement the facts secured thru the use of the tests which have been described by information secured thru informal tests of oral and silent reading. For illustration, when a pupil encounters difficulties in interpretation, it may be advisable to find out

the kinds of selections which cause most difficulty, such as fairy stories, passages containing a series of important facts, or passages which require independent thinking. Whenever there is need of such information passages may be selected from texts which are adapted to the purpose at hand. A brief description of an informal test follows:

In order to test a pupil's ability to get the main points of a story and to reproduce the essential facts in correct sequence a selection, such as "The New Voices", *Elson Primary School Reader*, Book II, pages 61-63, was used. Before reading the selections the pupil was given the following directions: "Find out why the animals wanted to change their voices." "Who helped them?" "What did the fox, the wolf, and the hawk do when their voices were changed?" "Why did they not keep their new voices?"

The most significant points which have been emphasized in this discussion can be summarized briefly by saying that every effort must be employed to secure accurate data on which to base conclusions concerning a pupil's fundamental difficulties in reading. As information accumulates great care must be observed in interpreting it in order to avoid wrong conclusions. This work cannot be delegated to a novice, but should be entrusted to experienced teachers of reading who have had training in tests and measurements.

Types of Remedial Cases

WILLIAM S. GRAY

IN October, 1921, a boy who had recently moved to Chicago from Kentucky was reported as failing in reading. A preliminary study of his case was made thru the use of standardized tests. The results showed that he was retarded approximately four years in oral reading and two years in silent reading.

An examination of his record sheet in oral reading showed that he failed to read the simplest passages accurately. His most significant errors were (a) repetitions, (b) insertions and omissions of short words or parts of words, (c) minor errors, such as *glowed* for *glow* and *bird* for *birds*, (d) substitutions of such words as *pretty* for *beautiful* and *hills* for *mountains*, and (e) substitutions of phrases such as *every morning* for *from morning till night*. These substitutions did not always change the meaning of the particular sentence in which they occurred, but were frequently inconsistent with the meaning of the entire passage, and indicated that he was not directing his attention to the content. A study of his test sheets in silent reading showed that he had difficulty in interpreting passages which were problematic in nature, and which required careful discrimination in reading or independent thinking. After a detailed study of his difficulties had been made it was concluded that the most significant explanation of his errors in reading was his extreme timidity and lack of confidence.

Remedial instruction was organized to accomplish the following purposes: (a) to secure his confidence and coöperation and to stimulate an interest in improving his ability to read; (b) to increase his mastery of the mechanics of reading, including the development of accuracy in the recognition of words, increasing his rate and span of recognition, improving the grouping of words in oral reading, and increasing his rate of silent reading; and (c) to develop more effective habits of interpretation. Individual instruction was given for twenty-five minutes each day for a period of eleven weeks. At the end of that time he had made up most of his deficiency in both oral and silent reading. As a result he showed marked improvement in all content subjects. He had gained in self-confidence, talked more fluently, and volunteered to recite and to express his opinion in class discussions.

This case has been reported at length because it is an excellent illustration of the fact that regular classroom instruction frequently fails to provide adequately for pupils who encounter unusual difficulties in reading. There are thousands of boys and girls in school each year who make little or no progress because of ineffective habits and personal handicaps which could be eliminated. These disabilities result in discouragement, retardation, and elimination in far too many cases. Society

recognized clearly that children differ widely in native endowment and learning capacity. It insists, however, that schools utilize every means possible to provide the most effective instruction for each child. In meeting this obligation, teachers are in need of at least three different types of information: (a) descriptions of the most significant kinds of remedial cases; (b) a knowledge of the technique of diagnosing individual cases; and (c) a knowledge of the most effective methods and devices for overcoming specific difficulties. In the three lectures which I shall give during the conference, I plan to discuss in as much detail as time will permit each of the three problems which have been mentioned.

There are striking differences in the accomplishments of children who encounter difficulties in reading. Some read intelligently but very slowly; others read rapidly but fail to give adequate attention to the content of what is read; still others understand anything they are able to read, but encounter serious difficulty in recognizing words. A complete list of these cases would be of great value to a teacher in recognizing and classifying pupils who encounter serious reading difficulties. In an attempt to secure information concerning characteristic reading difficulties, a request was sent last year to eight hundred superintendents, principals, and supervisors in various sections of the country for descriptions of remedial cases. Fifty reports were received from thirty school systems. They included a wide variety of interesting types which are illustrated by the following titles:

- A Fourth Grade Boy Who Was Unable to Read or Understand First Grade Material.
- A Fourth Grade Girl Who Encountered Serious Difficulty in Recognizing Simple Words.
- An Eighth Grade Boy Who Was Unable to Pronounce Many Simple Words Accurately and to Comprehend Simple Passages.
- A Sixth Grade Boy Who Was Unable to Group Words Effectively and to Read Fluently.
- A Sixth Grade Boy Who Read Slowly and Who Failed to Comprehend Because of Inadequate Mastery of the Mechanics of Reading.
- A Fifth Grade Boy Who Read Effectively to Himself, But Who Was Unable to Read Aloud Accurately.
- A Fourth Grade Girl Who Was Unable to Apply Her Knowledge of Phonetics in the Independent Recognition of Words.
- A Third Grade Girl Who Was Unable to Comprehend Simple Material Because of a Limited Meaning Vocabulary.

Only a limited number of illustrations have been given. The list is sufficiently long, however, to emphasize the fact that pupils who are retarded in reading differ very widely in the specific nature of their difficulties. Two pupils who fail in a particular phase of reading, such as intelligent interpretation, may do so because they encounter distinctly different difficulties. One pupil may fail because he is unable to recognize words; the other may fail because he has an inadequate meaning vocabulary. It is not enough, therefore, to know that a pupil fails in oral reading or is unable to prepare assignments in content subjects effec-

tively. Teachers must give tests, record facts, and study the errors of pupils until they determine the specific type of difficulty which each encounters.

In order to illustrate in greater detail significant types of remedial cases which have been found in elementary schools, a series of six reports which were submitted by F. W. Willard, assistant superintendent, Seattle, Wash., are included at this point. They represent an interesting variety of cases and contain statements concerning significant causes of failure in reading and appropriate remedial devices.

CASE A

A boy 11 years of age entered school at 6, attended regularly, and spent approximately five years in the first and second grades. He was tested at the Child Study Laboratory and found to have normal intelligence. He had practically memorized the first and second readers. His difficulty was diagnosed as partial word aphasia. This, evidently, was inherited because the father had great difficulty in reading and had never been able to master many of the connectives—for example, *this*, *that*, *these*, and *those*. Every known method of teaching reading was tried on this boy and failed. A resourceful teacher, finding that he had unusual motor coördination and a great deal of industrial ability, tried a small printing press, and in three months the boy was able to read a second reader he had never seen. He still has difficulty with many of the small words, but he is mentally so bright that he comprehends the printed page, even tho he cannot read all of the words.

CASE B

A boy 8 years of age, of normal intelligence, had attended school two years regularly and was still in the 1B class. His teacher reported the following series of very significant statements about him. "Very poor word memory. No phonetic sense. Stubborn. Does not enter into any of the school activities. Will take no part in the conversation." He entered the Restoration Class. The teacher found the boy to be extremely timid. For two weeks he answered in monosyllables. Various pictures and stories were used to find his line of interest. His interest was discovered when the picture of a Red Cross dog was shown to him. Using this as a cue, all sorts of pictures and stories of other dogs were used. At last a book was given to him and he was asked to read the story. In place of reading he told the story from memory. Confidence was established and the rest was easy. It was discovered that the boy had a good sense of sound and by individual work a phonetic basis was laid. The rapidity with which he progressed leads us to believe that it was extreme timidity that was at the root of the trouble. He was returned to the second grade and the follow-up report shows that he has had a double promotion and is a fluent reader.

CASE C

A girl 8 years of age in the second grade was unable to read. She was tested at the Child Study Laboratory and found to be normal mentally; she was also normal physically. She entered the Restoration Class. Study showed that she had no phonetic foundation and was unable to memorize all the new words introduced and consequently was very much confused. An attractive phonetic chart of the various families was made. Short stories were introduced to arouse the child's interest. A game was planned in which the teacher sounded the words and the child pronounced them. This was played for two weeks until the child expressed a wish to change the game and sound the words and have the

teacher pronounce them. It was discovered that the child had a real fear whenever she was asked to sound words. Confidence being established, she was taught to read and was returned to her grade in two months. The report shows that at present she is having no difficulty.

CASE D

A boy 9 years of age in the third grade tested above normal in the intelligence tests at the Child Study Laboratory. He had a vocabulary above the average, and a splendid phonetic foundation, but his reading was very laborious, as he had to sound even the simplest words. His eyes were tested and found normal. The home was visited and it was discovered that during the first year of school the mother had told the child that reading was difficult for him. This suggestion had been supplemented later on with "probably he never would be able to read as other members of the family could never read aloud". The family had emphasized the suggestion by reading to the boy. The matter was explained to the parents, their coöperation obtained, and a campaign of constructive instruction commenced. Books containing short stories were used, and several classmates read in concert with him. The boy had leaned on his phonetic crutch so long that he was afraid to give it up. A competitive game of sight reading was devised and followed up for three months until confidence was restored and the phonetic crutch thrown away. The boy was returned to his grade. The teacher's report states that at present the boy is having no difficulty.

CASE E

A boy entered school at 6 years of age in 1919 and remained in the first grade until February, 1921. He was tested by the Child Study Laboratory and found to have normal intelligence. He was sent to the Restoration Class. It was found upon investigation that he had a reading vocabulary of twenty words. He had a very bad habit of guessing. It was discovered that he was much interested in animal stories. With this as a cue, animal stories were read to him. He made an animal book by cutting out and pasting in pictures of animals. Then he told simple stories about animals. These the teacher printed in his book. After two weeks the boy wished to print his own stories. The teacher printed the stories on the board, and the boy with a small printing press printed the stories in his book. He was so proud of this book that he wished to take it home so he could read the stories to his mother. The motive was sufficiently strong to help him break up the bad habit of guessing. In six months he was reading in the second reader. He was returned to his grade and is having no difficulty.

CASE F

A girl of 10 years of age, who entered school at 6 and attended regularly four different schools, had great difficulty in reading in the second reader. She was tested at the Child Study Laboratory and found to be normal mentally, but to have very poor auditory memory. The child would sound a letter and call it another letter. The teacher soon found that she had no conception whatever of phonetics, and in fact could not pronounce a word after the teacher had sounded it. She also had difficulty in making the right sounds. She, evidently, had never learned to listen. Various methods were tried, but of no avail until the method used with the deaf children was tried. The child would put her finger tips on the teacher's throat to get the vibrations. By this method the child got an idea of sound. Since she had unusual rhythm it was utilized in the phonetic work. Her difficulties were gradually overcome. She was returned to her grade and at present is having no difficulty.

The next report was submitted by Superintendent C. J. Anderson and Miss Elda Merton of Stoughton, Wis., in an article for the *Elementary School Journal*. It describes the case of a fluent, oral reader who comprehended very little read silently. It has frequently been assumed that pupils who read orally with good expression usually understand what they read. Recent investigations have shown that this is not true in a large number of cases. The report which follows emphasizes the importance of beginning with very simple exercises, if pupils encounter unusual difficulties in interpretation.

The subject of this study was a fourth grade girl who was described by her teacher as slow and indifferent. When given the Gray Oral Reading Test in December she made a score of 41.25, which is 5.75 below the standard for fourth grade pupils. In the silent reading test she made unusually slow progress and was unable to reproduce what she had read or to answer questions. Evidence that she read all of the words was secured from noting her lip movements.

The next step in the diagnosis was to determine her ability to read the materials ordinarily assigned in the reading class. A passage from page 57 of the Merrill Fourth Reader was used in this connection. "The girl was instructed to read the selection silently for the purpose of getting the thought well enough to reproduce it later." She read at the rate of 1.05 words per second, she reproduced more or less inaccurately only a very small percentage of what she had read; her lip movements were very pronounced, and she answered only one question out of eight and that answer was inaccurate.

"To discover if mechanics of reading was causing the difficulty, she was asked to read the same material orally. She read fluently and with expression at the rate of 1.01 words per second, making only four errors. . . ." After studying all the data which had been secured, the following conclusion was reached in regard to her difficulties: "Knowledge of the rudimentary mechanics permitted her to read material far beyond her comprehension. She read words as names and not as symbols of ideas. The problem was plainly that of training her to read for content."

The remedial exercises consisted of passages cut from second and third grade readers. The first passage was very short, containing few ideas. Each succeeding passage was somewhat longer and made increasing demands on the reader in order to get the meaning. When exercises were assigned, the attention of the subject was directed to meanings rather than to pronunciations. "After she had given a reproduction of the 'story' and had answered a number of specific questions about it, she was asked to reread the selection in search of any thoughts she had overlooked during the first reading. She then gave a second reproduction. This last reproduction was, no doubt, largely a result of the specific questions. Nevertheless, it was valuable in training the pupil to see the richness of content in the selection."

The training period lasted for six weeks. One thirty-five minute lesson was given each week with the exception of one week in which two lessons were given. From five to seven paragraphs were assigned each lesson according to the methods described in the preceding paragraph. In May the oral and silent reading tests were given again. A comparison of the December and May records led to some interesting observations. "It is to be noted that there is no change in the rate, but the quality shows a decided improvement, bringing her score in this test up to 50, which is 3 points above the standard for her grade. This improvement is significant when it is remembered that no instruction was given in oral reading in these special help periods." Her silent reading records for December and May show a decided increase in rate and in quality. In December she was unable to reproduce a single thought or to answer a single question. In May she was fairly efficient along both lines.

The next report is practically the reverse of the one which has just been summarized. It describes the case of a third grade boy who was relatively strong in ability to interpret, but who was greatly retarded in the mechanics of reading. The original report was submitted by Superintendent W. C. French and Miss Eleanor M. Johnson, Drumright, Okla.

The subject of this case was 9 years and 9 months old. According to the Binet-Simon Intelligence Test his I. Q. was 97. An examination of his reading accomplishments thru the use of oral and silent reading tests showed clearly that he was very weak in the mechanics of reading, but relatively strong in ability to interpret. His specific difficulties were (a) inability to recognize unfamiliar words, (b) repetitions, due to carelessness, periods of confusion, and inability to group words effectively; (c) inaccurate return sweeps of the eyes from the end of one line to the beginning of the next; (d) a limited span of recognition, and (e) vocalization in silent reading. Remedial instruction was carried on for two thirty-minute periods each day for a month. Distinct and different types of exercises were given during each of the daily reading periods. In the morning an attempt was made (a) to increase his span of recognition, (b) to increase his ability to recognize words independently and accurately, and (c) to assist him in grouping words in thought units. During the afternoon period exercises were conducted (a) in oral reading to develop independence in recognizing words fluently, and (b) in silent reading to increase his rate of reading and also his ability to interpret. The tests at the end of the training period showed a notable increase in both oral and silent reading.

The reports which have been presented are representative of the much larger number which have been submitted. They show that pupils encounter numerous difficulties in reading and fail for a wide variety of different causes. Instead of presenting a larger number of cases at this time, the plan was adopted of summarizing the investigations which have been made in terms of important types of cases and their causes. In preparing such a report, an attempt was made to avoid technical discussions and to emphasize several types which have been found most frequently. This plan was adopted in order to make the report of value to supervisors and teachers in recognizing and classifying remedial cases which come under their observation.

The first type of remedial case to be discussed may be characterized as the pupil who has made little or no progress in learning to read. Such pupils are found in every grade of the elementary school, and even in the high school. They are unable to make satisfactory progress in most phases of school work because of their inability to read. Furthermore, they prove to be a serious handicap to the progress of the pupils with whom they are classified. The diagnostic steps which were taken recently in the investigation of four such cases revealed the following common characteristics:

1. They either failed to score in the reading tests or they fell below the standard for the first grade.
2. They either were unable to read or they read slowly, inaccurately, and without expression.
3. They interpreted what they read inadequately, and in many cases inaccurately.

4. They lacked confidence in themselves and were uncertain of pronunciations and meanings.
5. They engaged in reading exercises only with very great effort.
6. They appeared to secure little, if any, pleasure or intellectual stimulus from their reading.

The causes of little or no progress in learning to read may be summarized as follows: (a) general immaturity, poor language habits, and an inadequate background of experience; (b) low native intelligence or poor learning capacity; (c) dyslexia, or failure of those areas of the brain to develop in which meaningful associations with printed or written symbols are registered; (d) partial deafness; (e) poor vision; (f) poor visual memory; (g) poor auditory memory; (h) malnutrition; (i) extreme nervousness; (j) timidity; (k) inattention or lack of interest; and (l) lack of application. It is evident that remedial instruction must vary with the causes of failure, if it is to be most effective. Anyone who attempts remedial instruction for a pupil who has encountered serious difficulty in learning to read should devote whatever time and energy are necessary to an accurate determination of the causes of retardation before remedial instruction is planned.

The second type of remedial case includes pupils who encounter difficulties primarily in intelligent interpretation. These pupils may be able to read very fluently, but they fail in the adequate interpretation of the content of passages. In many classrooms in which the mechanics of reading have been emphasized, it frequently happens that a relatively large number of pupils are found who are weak in interpretation. Such pupils usually encounter serious difficulties in content subjects, because they are unable to prepare assignments effectively. It is both interesting and significant that pupils who are reported as weak in interpretation are usually middle or upper grade pupils. The explanation, doubtless, lies in the fact that reading accomplishment in the lower grades is judged primarily in terms of the mastery of the mechanics of reading. Hence, serious difficulties in interpretation are usually not noted until pupils begin to study content subjects independently.

Five pupils who were studied recently and who encountered difficulties in interpretation revealed the following common characteristics: (a) each scored relatively low in most of the comprehension tests; (b) their difficulties in interpretation were far more serious than those in recognition; (c) they had inadequate meaning vocabularies; (d) their reading experiences were limited; and (e) they did little or no reading on their own initiative. Altho these pupils possessed several common characteristics, they differed widely with respect to their difficulties in interpretation. One pupil had failed to establish the habit of directing her attention to the content; a second was erratic and inaccurate, supplying ideas which were not found in the passages; two pupils interpreted simple interesting selections effectively, but failed to interpret passages of a factual or problematic type; the fifth failed in interpretation because of limited mental capacity and general immaturity. It is clear from this summary that a teacher who selects a pupil for remedial instruction who is weak in comprehension is under obligation to determine the spe-

cific kinds of interpretation problems which cause most difficulty. For illustration, does he fail to direct his attention to the content, has he an inadequate meaning vocabulary, is he unable to select important points and supporting details, or does he fail to think independently about what he reads, to weigh values effectively and to draw accurate conclusions?

A third significant type of remedial case includes pupils who encounter difficulties primarily in the mechanics of reading. In the investigations, which have been reported recently, pupils have been found in all grades of the elementary school who are notably weak in the rudimentary phases of reading. This indicates failure on the part of the teachers in the lower and middle grades to establish fundamental habits and associations effectively. Altho a thoro mastery of the mechanics of reading is far less significant than ability to interpret effectively, nevertheless, recent investigations show clearly that pupils who have not learned to read fluently and accurately are seriously handicapped in interpreting the printed page. It is of very great importance, therefore, that teachers in the lower grades test pupils frequently, keep accurate records of their progress, and provide individual instruction frequently in order to insure a thoro mastery of the mechanics of reading. In securing these results, attention should be given primarily to the problem of establishing habits of thoughtful reading.

A very significant fact concerning six remedial cases in the mechanics of reading is that each scored low in the Gray Oral Reading Test. Furthermore, they read aloud inaccurately and failed to group words effectively in thought units. A detailed analysis of their reading habits showed that in most cases they made a large number of fixations per line, that regressive movements were frequent, that they had a narrow span of recognition, and that they encountered unusual difficulties in the recognition of words. Furthermore, some of the pupils, who were able to recognize simple words accurately, when they were presented individually, failed to recognize them accurately in sentences. Most pupils who encountered difficulties in recognition read very slowly. At least two pupils, however, made numerous errors because they read aloud too rapidly and failed to note the details of words with sufficient care. Remedial treatment in each case required a deliberate study of the kinds of errors which were made and the organization of individual instruction which was calculated to enable them to overcome the difficulties which retarded their progress.

Some of the more important causes of difficulty or failure in mechanics of reading may be summarized as follows:

(a) Defective vision which usually results in difficulties in recognition.

(b) Poor auditory memory which results in failure to remember the sounds of words.

(c) Immature language habits which cause frequent repetitions, omissions, and insertions.

(d) Self-consciousness and timidity which are accompanied by lack of confidence, uncertainty, and inaccuracies.

(*c*) Lack of interest in reading which usually results in ineffective application.

(*f*) Carelessness and a lack of feeling of responsibility for accurate work are usually accompanied by numerous errors.

(*g*) Failure to attract attention to the content while reading results in errors which could be avoided if the content of the passage were clearly in mind.

(*h*) Difficulty in associating the pronunciation of words with their symbols, which results in inability to recognize and pronounce words independently.

(*i*) A narrow span of recognition retards the rate of reading and results in failure to recognize and express words in thought groups.

(*j*) Irregular eye movements interrupt recognition and lead to dissipation of effort.

A fourth type of remedial case relates to pupils who read silently at ineffective rates. Recent classroom investigations have shown that a good reader may read as many as eight or ten words per second. On the other hand, there are pupils associated with him in the same class who read not more than two words per second. Ability to read rapidly is a good measure of the mastery which the reader has of the printed page. In the second place, rapid readers usually understand what they read more effectively than slow readers. There are notable exceptions to this general rule, however. In the second place, the slow reader is unable to pass rapidly from the printed symbol to the meaning. "The mere mechanical processes are obstacles and he loses time in trying to perform the mental acts which are necessary before he can comprehend the passage. In the case of the good reader, the mechanics of the process are fluent and rapid. The proficient reader has mastered the words and moves on without hesitation to the meaning." The causes of slow reading which were discovered recently in the detailed diagnoses of several cases are, (*a*) irregular movements of the eyes from left to right along the printed line; (*b*) inaccurate return sweeps from the end of one line to the beginning of the next; (*c*) a narrow span of recognition; (*d*) failure to attract attention to the content; (*e*) lack of interest in reading; (*f*) general weakness in the mechanics of reading, and (*g*) slow-learning capacity. O'Brien in the Twentieth Year Book, Part II, discusses twelve factors which are very important in increasing the rate of silent reading. Anyone who undertakes remedial instruction to increase rates of reading will profit very much by a careful study of O'Brien's article entitled, "The Development of Speed in Silent Reading."

Altho pupils who read at ineffective rates usually read too slowly, pupils have been studied who read ineffectively because they read too rapidly and neglect details. In such cases a pupil's attention must be attracted to the content of what he reads, and he must be held responsible for the accurate recognition of words and meanings. This usually results in temporarily decreasing his rate of reading. As soon as habits of accurate recognition and interpretation have been established, exercises should be introduced to increase the rate of accurate reading. The statement should be added that cases of this type must be studied very

carefully in order that the most effective types of instruction may be given at each stage in the reorganization of the pupil's habits.

A final type of remedial case which can be discussed at this time is illustrated by the pupil who has made some progress, but who is relatively weak in both oral and silent reading. Pupils who are seriously retarded in most phases of reading are found in practically all classrooms. They are unable not only to do satisfactory work in the reading class, but to prepare assignments in content subjects effectively. Their deficiencies are both quantitative and qualitative. Because the classroom teacher has never learned how to deal with such pupils successfully or because she has little time or energy for individual instruction these pupils soon become discouraged and in far too many cases discontinue school work entirely. The diagnostic and remedial studies which have been made show clearly that the difficulties which many pupils encounter can be overcome successfully if appropriate remedial instruction is provided.

Fortunately for the classroom teacher, pupils belonging to the type described in this chapter can be readily distinguished.

1. They fall below the standard scores in practically all reading tests.
2. They are slow, inaccurate oral readers and they fail to comprehend what they read silently.
3. They are unable to prepare effectively assignments in content subjects in the usual length of time.
4. Whenever difficulties are encountered in reading they are unable to work out their problems independently.
5. They are not interested in reading exercises and they do little or no reading on their own initiative.

The specific causes of weakness in practically all phases of reading which were found in recent investigations of more than twenty cases, may be summarized by the following statements: (*a*) low native intelligence, inadequate language habits, and lack of general experience; (*b*) little or no interest in reading, a careless, indifferent attitude toward school work, and ineffective attention and application; (*c*) inadequate attention to the content, difficulties in the mechanics of reading, ineffective rates of reading, and an inadequate meaning vocabulary; failure to think independently about the content, and inability to picture unfamiliar situations; (*d*) poor home environment, distracting social influences, and inadequate parental guidance; (*e*) inadequate reading materials and poor instruction.

The five types of remedial cases which have been described in this discussion are: pupils who make little or no progress in learning to read, pupils who encounter serious difficulty in intelligent interpretation, pupils who encounter difficulties primarily in the mechanics of reading, pupils who read silently at ineffective rates, and pupils who encounter fundamental difficulties in most phases of reading. The teacher who attempts to diagnose a poor reader should determine first of all the general type to which he belongs, and she should then canvass various possible explanations before reaching final conclusions and planning remedial instruction.

Remedial Measures in Reading

WILLIAM S. GRAY

FIVE types of remedial cases were described in an earlier discussion. They were pupils who had made little or no progress in learning to read, pupils who encountered serious difficulties in intelligent interpretation, pupils who were weak primarily in the mechanics of reading, pupils who read silently at ineffective rates, and pupils who had made some progress but who were retarded in all phases of reading. Practically every teacher has pupils under her instruction who encounter serious difficulties in one or more phases of reading. The problem which confronts her is that of providing appropriate instruction. The discussion which follows describes methods and devices which are of value in specific cases.

There are several general suggestions which merit consideration by a teacher who is organizing a program of remedial instruction.

1. Pupils who encounter serious difficulties in one or more phases of reading are usually weak in other phases also. Remedial instruction should, therefore, aim to correct minor errors as well as the more significant ones.

2. If several remedial cases belong to the same general type, group instruction may be used to advantage in overcoming common difficulties. As a rule, however, individual instruction will be necessary in particular cases. If it can be arranged, individual instruction should be provided in each remedial case, because a pupil usually responds more effectively and overcomes his difficulties more rapidly under such conditions.

3. The first step in remedial instruction is to secure the whole-hearted interest and coöperation of the pupil. If a teacher does not have his complete confidence, the likelihood is that the results of instruction will not be satisfactory.

4. Remedial instruction implies a new start in learning to read. The starting point should be with reading materials which are sufficiently simple to insure a fair degree of success in the first exercises. Teachers usually make the mistake of assigning passages from the readers which the pupil has been using. It would be much better to use selections from books appropriate for pupils of earlier grades.

5. The methods of teaching are those which a skilful teacher would ordinarily use in the case of a pupil who was encountering difficulty in reading. It has frequently been assumed that a pupil can be restored to his class thru the use of one or more drill devices. While it is true that specific exercises are essential, they must be supplemented by a large amount of reading, in order that the habits which are developed in the drill exercises may be used habitually in all reading activities.

6. One of the most valuable steps which the remedial teacher can take is to provide the pupil with an abundance of relatively simple, interesting reading material and a genuine motive for reading it. After all, the best way to establish effective reading habits is thru wide reading under skilful supervision.

7. A careful record must be kept of the pupil's progress and methods must be introduced from time to time which are appropriate for him at each stage in the reorganization of his reading habits. This implies that the teacher must continue diagnostic steps until remedial instruction is no longer necessary.

After a teacher has planned the major steps of instruction in a particular case, she will have to meet from day to day a large number of specific teaching problems. It would doubtless be suggestive if each could be discussed in detail on this occasion. This will not be possible today, however, because an adequate discussion of methods of remedial instruction would require many hours. I have decided, therefore, to select a number of specific problems and to describe methods which have been used successfully during the current year in individual cases.

The statement was made earlier that the first step in remedial instruction is to secure the genuine interest and coöperation of the pupil. This can be done most effectively, as a rule, by discovering the things he is interested in thru informal discussions. If he reads voluntarily, what kinds of books does he select? If he is not interested in reading, what are his interests in other activities? The first reading selections should be chosen with reference to his interests and should be simple enough to permit him to read them successfully. The report which follows describes the methods which were used in securing the interest of one pupil.

G.S., a fourth grade girl, was not interested in the content of simple selections which she could read successfully and was unwilling to read them for the purpose of overcoming her difficulties. In fact, she resented being asked to read selections contained in first or second readers. In order to provide simple material and to avoid using books labeled as first or second readers, she was given interesting selections cut from books which she had never seen. These were mounted on cardboard to preserve them and to make them easy to handle. The cardboards were then fastened together, making a separate booklet of each story. As soon as she had made progress in reading simple passages, she was assigned selections in ungraded readers. She later expressed a preference for long stories and was given "Reynard the Fox" written for children by Smythe. This was simple enough to enable her to read fluently. The fact that it was an entire book interested her.

Suitable and attractive books were left on the reading table and, altho she looked thru them daily, she did not express a desire to take one for several weeks. While looking at them she was often told what they were about or which ones certain children preferred. One day she seemed especially interested in Nida's "Ab the Cave Man". The first chapter was read to her. In the next few chapters she read the easier parts and the teacher read the remaining sections. At the end of the period she was told she might take the book home. The next day she announced that she had read fifteen pages and she seemed interested. A few minutes of each period for a few days were devoted to discussions of the parts she liked best, to reading an occasional chapter aloud, or to reading new chapters. She soon finished the book and asked for another. This was the beginning of her first real interest in reading, and,

altho her progress had been slow, it was much more noticeable thereafter. Her brother, who was younger, became interested in the books she took home. He could read more rapidly than she and aroused her curiosity by telling her what was to come. This kept her in a state of expectancy and caused her to read more rapidly and with keener interest. In this way she learned that reading provided very interesting experiences, and she was willing to receive help in class in order that she might read other more difficult books for herself.

In addition to stimulating a general interest in reading, the pupil's interest must be aroused in a specific selection which he is asked to read. This is true, no matter what the nature of his difficulties may be. If he is interested and has some definite purpose in mind while reading, his attention will be centered on the content and he will do his best work. The report which follows shows how the interest of a second grade girl in reading assigned selections was secured.

S.D.'s interest was aroused by calling her attention to the pictures or by suggesting something of interest in the story to challenge her attention. For example, such questions and suggestions as the following were given: "What do you think the children in this picture are going to do with the bird? Read the story to find out if your answer is correct." "This boy has a pony. How do you think he got it?" "Read the story to find out how he got it, how he learned to ride and where he was going." Informal discussions revealed the fact that many of the experiences were new to her, and it was necessary to create a background which would enable her to understand and enjoy them. When new situations were explained to her, when meanings of words were made clear, and when she was given a motive for reading, she usually responded with evidence of real interest.

A pupil who encounters serious difficulties in the mechanics of reading may be weak in one or more of the following phases: (a) he may have unusual difficulties in learning to recognize words; (b) he may recognize words inaccurately, mispronouncing, omitting, or inserting parts of words; (c) he may recognize isolated words accurately, but fail to recognize them when he sees them in sentences; (d) he may recognize words individually rather than in thought groups; (e) he may fail to direct his attention to the content; or, (f) his language training may be inadequate or ineffective. The report which follows illustrates the methods which were employed in establishing effective habits of recognition in the case of a second grade girl who had made little progress in learning to read, due to partial deafness, poor visual memory, and general immaturity.

In order to establish correct reading habits, it was necessary to use methods similar to those used with a first grade pupil who is just learning to read. As a rule, familiar selections were used at first. If an unfamiliar story was used a part of it was told to her briefly in order that she might be aided in reading thru a knowledge of the content. This also helped her to recognize words and prevented many errors. Each sentence or short paragraph was prefaced with a suggestion concerning its content, such as "The next line tells where the boy found his rabbit" or "The next paragraph tells why the dog ran away." She was asked to read such units silently before reading them aloud, and she was told to ask for help when she encountered words which she did not know. She was then able to read the paragraph aloud with a fair degree of accuracy and fluency. When supplying a word which she did not know, it was

necessary to pronounce it very distinctly and to let her see the lips of the speaker in order that she might get its pronunciation accurately.

The words which caused difficulty were used in sentences on the board at the end of the recitation period. Duplicate sentences, phrases, and words were used for matching. Parts of sentences were sometimes erased, leaving the phrases which caused trouble. These were later printed on cards and used in quick-perception drills. Words with which she could make no definite associations, such as *what*, *where*, *there*, *that*, *this*, etc., caused greatest difficulty. It was several weeks before she was able to recognize the word *there* at sight while reading, altho she encountered it several times each day. After a word had been used in drill exercises it was written on the board in a sentence and left there for several days. Whenever she failed to recognize it while reading, her attention was called to the sentence on the board. She was usually able to correct her error.

Lists of words beginning with *th* and *wh* were written on the board in order to help her to distinguish between them. Her confusion, no doubt, was due to her inability to distinguish between sounds and to her poor visual memory. After presenting words in sentences for a number of days, they were used in flash-card exercises. Later several of the words which caused difficulty were used in sentences in the same exercise to test her ability to recognize them. She was then asked to match isolated words with those in the sentences. These words were also used in quick-perception drills. Sentences were written on the backs of the cards containing the words and were used as an aid in recognition, if necessary.

Many pupils are known as "word readers" because they recognize and pronounce words individually rather than in groups. The report which follows describes the methods which were employed in training a third grade boy to recognize words in thought groups. This was an essential step in developing habits of effective oral expression.

To overcome his tendency to read one word at a time and to decrease the length of the periods of fixations, he was given exercises to increase his span of accurate recognition. Furthermore, sentences which he read poorly were written on the board and he was shown which words belonged together. They were then read to him and the grouping was emphasized; for example, *The little dog had a bone*. He was then asked to read the sentence rapidly and put the words together in appropriate groups. Thru imitation and suggestion he soon learned to group words more effectively. Whenever he began to read one word at a time and to hesitate while reading, the teacher read several paragraphs to him. He was usually able to read more rapidly and effectively after hearing the teacher read.

Many pupils fail in intelligent interpretation and in oral reading because they are unable to recognize words independently. It is essential that steps be taken in many cases which call attention to the details of words. The following report describes the methods which were used in developing independence in the recognition of monosyllabic words.

This second grade girl had formed the habit of anticipating words by studying the content. Frequently, however, she substituted a word which did not change the meaning materially, but which was entirely different in form from the printed word. For example, in the sentence *He went to the stream for a drink* she substituted the word *river* for the word *stream*. It was evident that she gave little or no attention to the details of words. She frequently failed to recognize words in sentences because there was nothing in the content to suggest the right word, and therefore the word which she substituted frequently changed the mean-

ing of a passage. For illustration, in the sentence, *Once there was a boy* she substituted the word *fox* for the word *boy*. These errors led to the conclusion that some training in phonetics would assist her in accurate recognition and interpretation. Accordingly, her attention was called to the first part of the word *boy*. Several familiar words beginning with *b* were written on the board and she was asked to add to the list. Other consonant sounds, such as *m*, *n*, *d*, and *t* were emphasized when she confused them or failed to recognize them. She was also given help in certain vowel sounds which caused difficulty. Altho instruction in phonetics was little more than begun at the end of the training period, it was clear that she had benefited by it and that further instruction was advisable.

Oral reading tests show clearly that many pupils read inaccurately, because they are unable to recognize polysyllabic words. Specific attention is necessary in many cases to such difficulties. The following report describes methods which were successful in the case of an eighth grade boy.

Because his method of analyzing words was ineffective he was unable to pronounce polysyllabic words. Such words were therefore divided into syllables in order that he might see the familiar words or parts of words of which they were composed. His attention was then called to prefixes and suffixes and a study was made of their meaning. When he failed to pronounce the word *progressively*, it was divided into syllables and he was first given *pro gress*, then *pro gress ive*, and finally *pro gress ive ty*. Other words beginning with *pro* were listed; also words ending with *ive* and *ty*. Words containing other prefixes and suffixes were studied as difficulties arose. Lists of words were studied and recorded in a notebook. These lists were reviewed from time to time and new words were added.

He frequently misplaced the accent in both short and long words. These were divided into syllables and the correct pronunciations indicated by means of accent marks. He voluntarily made lists of words which he encountered in other subjects. He was given help on these at first. Later he was encouraged to use the dictionary. Diacritical marks were explained and certain vowel digraphs which caused difficulty, such as *ar*, *or*, *au*, *ou*, and *oo*, were studied.

A careful study of pupils who are weak in comprehension reveals the fact that they vary almost as widely in the specific nature of their difficulties as those who are weak in the mechanics of reading. Some pupils are able to interpret very little of what they read. Others may be fairly successful in interpreting selections in which the story element is strong, but fail in the interpretation of material of a problematic nature; others are unable to interpret factual material accurately, inserting and changing ideas to suit their fancy; still others can interpret factual material, but are unable to interpret selections of an imaginative type; and, finally, there are pupils who are successful in interpreting the printed page, but who do not think independently about what they read. The remedial instruction for each type must necessarily differ from that used with every other type.

The report which follows describes the case of a fifth grade girl who read aloud very fluently and with excellent expression. She scored unusually high on the oral reading test, she had a wide span of recognition, and her reading habits seemed very mature. She failed almost completely in all comprehension tests. She was unable to interpret adequately the very simplest selections which were assigned. It was neces-

sary, therefore, to begin with simple paragraphs at first and to teach her to look for meanings while reading. These short units were discussed and reread orally until she was able to answer one or two specific questions based on their content. The following description describes the procedure which was followed from that point.

The first assignments for independent reading were fables or short selections containing only one or two significant points. In this connection, she was given specific directions or questions to direct her attention to the content, such as "Why were the rabbits in the story timid?" or "What taught them not to be afraid?"

Inasmuch as she became confused when different types of stories were assigned, she continued to study one kind until she became fairly successful in its interpretation. She was given fables for a few days, until she formed the habit of looking for the main point. In order to avoid monotony, the assignments were varied. Sometimes she was asked to read silently and to reproduce the story, or after reading she was occasionally given such exercises as the following: "Write the name of the animal that lost its tail" or "If you think the deer deserved his punishment, write the word *yes*; if not, write the word *no*." At first when she was asked to reproduce a fable, she confused the order in which incidents occurred, omitted important points or forgot whether it was a bear or a fox which was mentioned in the fable. It was necessary in such cases to assist her by asking questions which directed her attention to the important ideas and which recalled the facts in correct sequence.

Simple narratives were next assigned. These were also read in short thought units at first. Later she was given lists of questions to use as a guide while reading. After reading the selections, she was asked to look over the questions again and to reread the parts of the story which she did not remember. After a number of selections were studied in this way, she began to assume some responsibility for accurate interpretations and she read more carefully. Her own interest in her progress was evidenced by such questions as "Did I tell that story well?" or by such remarks as, "I answered the questions without help today."

She was also assigned animal tales, fairy stories, stories of adventure, and imaginative stories of all kinds. As soon as she made satisfactory progress in interpreting simple passages, more difficult selections were assigned. When she read orally, passages were discussed, meanings were explained, and thought-provoking questions were asked. When she read silently she was given specific directions or a list of questions to aid her in effective interpretation.

Time will permit the discussion of only one additional remedial case in interpretation. The report which follows described the methods which were employed in stimulating an eighth grade boy to think independently about what he read.

As he developed in ability to read simple material, more difficult material was assigned. Greater emphasis was then placed on silent reading. Thought-provoking questions were assigned, and every effort was made to stimulate independent thinking. For illustration, he was asked to sum up all of the facts which led up to a certain act, to characterize people, to determine the significance of people or incidents in reference to the plot, and to give reasons for his own opinions. Attention was also given to figures of speech, subtle meanings, and important references of a geographical, historical, or literary nature. He was encouraged to ask questions when the meanings of passages were not clear and he frequently brought to class questions or references based on his reading in other subjects which he failed to understand. They were discussed and explained.

Some children read slowly because they have a narrow span of recognition, or fail to recognize a group of words at each fixation of the eyes. By directing their attention to the content and by emphasizing effective grouping in oral reading they form the habit of recognizing several words at each fixation. Before they become rapid silent readers, it is necessary to supplement their training with exercises to increase the span of recognition in order to insure fluent habits of reading. The three reports which follow describe devices which were used in three different cases to improve the rate of reading.

Typed sheets of stories were assigned in which the material was separated into natural thought units by special spacings. These exercises emphasized larger thought units. She profited considerably by this work, as evidenced by more effective grouping of words in oral reading and a more rapid rate of silent reading.

Cards containing short phrases, such as *he said, ran away, one day, asked she*, which were encountered frequently in the reading exercise were used in quick-perception drills. The length and difficulty of the phrases were increased as rapidly as possible. Phrases, such as *again and again, once upon a time, as far as he could, the little boy said*, were used. Each card was exposed once and a record of the number of errors which were made each day was kept.

He was assigned a short selection and a record of the time required to read it was kept. The number of words in the selection was counted and the number of words read per minute was calculated. By using material of the same level of difficulty each time, it was possible to compare his progress at frequent intervals. In order to tell whether or not he had given attention to the content while reading, he was asked questions about it or was asked to retell the story. He became interested in increasing his rate and watched his own progress as the tests were given.

Only a limited number of methods have been described. They are sufficient in number to emphasize the fact that methods must vary with the character of a pupil's difficulty. Furthermore, many of the methods which are now being used in remedial cases can be employed to distinct advantage in group instruction. Rather than present a larger number of specific cases, it seems advisable to reserve the remainder of the period for the discussion of problems which anyone may wish to present.

Group Tests for Measuring Observational Learning and Accuracy of Report

WILLIAM F. BOOK, *Professor of Educational Psychology in Indiana University*

MR. CHAIRMAN and members of the Ninth Annual Conference on Educational Measurements, as I see it, each science or department and each professional school in a state university has three distinct fields of service to render to the people of the state:

1. It must first instruct a selected group of young people in the methods and lore of that science and train these leaders for specific occupations or callings in life.

2. It should investigate the practical and theoretical problems which that field of science presents with a view of developing an array of special techniques or methods designed to aid in the solution of some or all of the practical problems which that science can assist the people of the state in solving.

3. It should carry the results of these investigations and the accumulated experiences of the race in that branch of science to all the people of the state so far as this is humanly possible, bringing the university to the very door of the citizens of the state.

The matter which I shall present this afternoon and that dealt with in the two supplementary reports by Mrs. Beard and Mr. Chambers, graduate students in the department of psychology, belongs entirely in the second field mentioned. That is to say, we have been trying this year to develop a method or technique for measuring the improvement which an individual or class actually makes in learning to observe and report accurately upon the things found in the external world about him, a form of reaction which requires the exercise of a group of human abilities which should, if possible, be cultivated in the school because the ability to note and observe accurately is the beginning of all knowledge and lies at the very root of all acquisition, even learning to get the right thought from the printed pages of a book. But first a word about the importance of standards and measurement in general and its consequent place in educational practice.

1. Importance of Standards and Measurement for Educational Practice

Everything in the world differs from every other thing both in quality and in amount. We therefore have two ways of studying anything which we may investigate. (1) We may point out the essential characteristics or elements of difference between the things which we

study or (2) we may measure the amount of such differences as are found among the things which we are studying, for if a thing exists, it exists in some amount which can be accurately measured if we know how. The problem of measurement, therefore, presents one of the most important aspects of the investigation of *anything* which we may study, because things cannot be fully understood until their quality and quantity have both been accurately determined.

But there is another reason for the development of the science of measurement in the field of educational endeavor. Measurement is essential to facilitate acquisition and learning. This has been demonstrated in a striking way by two psychological investigations carried on in this University last year. In the first study, just completed, 124 college students were given 75 practices in four simple types of learning.¹ They were divided into two sections, a stimulus and a control group. Each of these sections was then subjected in four widely different types of learning to two sets of conditions, one devised especially to interest them in the improvement they were making in the acquisition, the other to create just the opposite set of conditions for the learners. During the first two-thirds of the practice the stimulus group in each type of learning was given an exact knowledge of their score and interested as much as possible in their rate of improvement, while the control group was kept ignorant of their score and other conditions arranged so they could not possibly become interested in the improvement they were making. At the end of the first two-thirds of the practice the group which was allowed to keep track of the progress they were making, and which had been especially interested in the gains they were making, was made the control group for the last third of the practice, and the other section was subjected to this special set of incentives. In the practice for the other types of learning these conditions were alternated in each succeeding type of learning.

It was found in this investigation that for all four of the different types of learning studied, the students who were required to keep track of their progress by our method of accurate measurement and who by other means were especially interested in their rate of gain, progressed very much more rapidly than did the groups which were kept ignorant of their score and who were not allowed by the conditions of the experiments to interest themselves in the gains they were making. When the conditions were reversed at the end of the first two-thirds of the practice, the former stimulus sections not only ceased to improve in response to their practice, but failed even to make the score in succeeding practices which they had been making in the previous practice, while the control groups began to improve very rapidly at this point and continued to gain rapidly to the end of the practice. In both sections and for all individuals improvement was made in direct proportion, as we were able to interest the learners in the gains they were making and were able to arouse in the members of the group an intention on their part to increase their skill in the performance.

¹William F. Floyd and Lee Novell, "The Will to Learn", *Journal of Educational Psychology*, October, 1917.

That this interest in improvement as such and a knowledge of the progress that is being made is a *necessary* factor in all acquisition, if learners are to progress beyond the *ordinary limits* of skill, was clearly shown by a second study made in the Indiana University laboratory last year by Dr. Kitson, who studied the daily output of 40 hand compositors at the Lake Side Press in Chicago for a period of 12 months. He found that under the specially arranged bonus system, set up in that establishment, the efficiency of *every* man was increased on the average from 58 per cent to 97 per cent in 20 weeks. All were experienced printers when they entered the plant and had worked at the trade for from 1 to 27 years, their average printing experience being 10.3 years. But notwithstanding this fact, they made an average gain in their output in 5 months, under the stimulus of the bonus system, of 67 per cent over and above the average score made during the first week of service in the plant. One man who had worked at the trade 27 years made a gain of 142 per cent; a man who had been working at the trade 14 years increased his rate of work 282 per cent; the most experienced half of these workmen increased their output on the average 50 per cent, while the half which had the least experience at the trade (6.3 years) made an average gain per man of 75 per cent. And, altho they were all considerably under the minimum bonus point when they started to work in the plant, the study showed that under the influence of the bonus and with an exact knowledge of their daily score, 21 out of the 40 men had exceeded the bonus point at the end of the fourth week. In 5 months 35 out of the 40 men had reached this point; 50 per cent of the men had increased their rate of work far beyond the bonus point and so were receiving their extra pay.

That we have here a genuine case of learning, taking place in men who had worked at the trade some of them as long as 27 years, is evident. If it were a mere case of speeding up, or if it were due to the expenditure of more effort, the results would have been more immediate and the increase would not have been spread out over so long a period of time. That it was a genuine case of learning induced in well-seasoned printers by the desire for improvement and an *exact knowledge of their improvement* is further shown by the fact that the less experienced half of the workers, those who had worked at the trade 14.3 years, increased their output only 50 per cent, while the other half increased it 75 per cent. It is reasonable to conclude that the more experienced workers, being more set in their methods of work, found it harder to leave their old and less efficient habits of work behind, and therefore more difficult to invent the new and better methods of working required to increase their skill.

These and other psychological studies show that an exact knowledge of the improvement that is being made in learning and the arousal of interest on the part of the learners in the gains they are making is one of the strongest possible incentives for learning. *A learner seems to profit by his practice in direct proportion as we incite his will to progress, or arouse his intention to improve. This cannot be done without a reliable and practical method of measuring the results achieved in the learning itself.*

2. Some Weaknesses in Our Present Methods of Educational Measurements

During the past ten years reliable methods for measuring native mental endowment have been devised and refined, also methods for measuring the rate at which children master the problems presented by the task of reading. Scales for measuring their achievement in various other school subjects have also been devised, but none of these methods of measurement really reach the most basic educational problem involved. In the field of educational measurements, for example, we have only *achievement* scales which show how well a child or class can read the vernacular or how rapidly and accurately he can add and multiply. They do not measure how well he has mastered the actual technique of learning, or acquired the habits which make this achievement possible. The learner may have obtained his results by a method of procedure which is the worst possible way to deal with the problems presented by the task of *learning* to read. There is no time to dwell on this point further than to say that in the judgment of the speaker we do not need *achievement scales* so much as we need real *learning tests*, or methods of measurement for each of the school subjects which will enable a superintendent or teacher to determine in an accurate and practical way how rapidly a pupil or class is progressing in the mastery of the technique of *learning that particular subject* or to measure the progress he is making in acquiring the particular habits and responses which make achievement in that subject not only possible, but most economic and efficient. We need to know how rapidly the learners are acquiring the one best way of dealing with the problems which the *actual learning* in that field presents. If we had such learning scales we would not need to fuss so much about the so-called diagnostic tests which approach the solution of the real problems presented to the learner thru the back door, if they reach them at all.

But what in my judgment is of still greater importance than developing such practical methods for measuring the progress made in *learning* the various fundamental *school subjects*, is to develop other techniques of measurement of which you have heard little or nothing at all. I refer to measuring such types of acquisition as the following: the progress which children and students make in learning to observe and report accurately and completely upon the things found in the external world about them; learning to think and reason; learning to solve original problems for themselves; learning to use their imagination; measuring their ability to concentrate their attention or to use their minds in an effective way in the pursuance of any required or chosen task; measuring the progress they are making in developing persistence or the ability to finish a task once begun. It is far more important to measure the progress which children are making in these fundamental types of acquisition than to measure the gains they are making in any particular subject which they study in school. As a matter of fact, the entire work of the school is carried on, in the main, to achieve just these results.

But one of the most important steps in determining how all of these most basic types of acquisition may be cultivated is to get a reliable

and thoroly practical method of measuring the progress which a given pupil or class is making in each of these fundamental types of learning. Take as an example the fundamental place of quick and accurate observation in all learning. It is the basis of acquisition of every sort because all knowledge comes thru the experiences we gain thru the senses. Reading itself and learning to spell is very largely a matter of accurate and ready observation, and almost as much may be said of the other fundamental types of learning which I have enumerated. It is, therefore, far more important that progress should be made in this basic type of acquisition than that any particular school subject should be learned.

Now, can the progress that a child or class makes in learning to observe and report accurately and completely upon the things found in the world about him be measured by a technique which is accurate, and which at the same time can be understood and *used* by the average superintendent and teacher? The answer is that we believe we have done it and it is the purpose of my part of a sort of three-cornered report on our investigations to explain the method which was worked out for measuring progress in observational learning and accuracy of report.

3. Problems Studied in This Investigation

In devising these methods of measurement and making the investigations of observational learning upon which a tentative report will be made by Mr. Chambers and Mrs. Beard, we had four main problems in mind:

1. Can one's ability to note the things in the world about us and to report such facts accurately and quickly be measured by a method that is reliable and practical for use in the schools? In the rest of this paper I shall attempt to demonstrate for you the method which we devised to measure observational ability in groups of individuals taken *en masse*, such as compose our regular school and college classes.

2. Is one's ability to observe and report upon the things found in one's environment a fixed quantity, or may it be cultivated and improved by special training and practice; if so how much and how? Mrs. Beard will make a preliminary report on this problem.

3. Is this important type of ability or form of acquisition being improved by the work now done in the schools?

4. Which studies in the curriculum contribute most to the improvement made in this fundamental type of acquisition? Mr. Chambers will present a tentative report on the data which we have thus far obtained bearing on these problems.

If the ability to observe can be successfully and accurately measured by a method which is practical and reliable we may determine whether the group of mental functions involved in observation and report can be cultivated or improved by special training and practice. The rate and amount of such improvement may also be ascertained, because we may establish with the aid of such methods of measurement a standard for measuring the results of such training and so open up a way of determining how this group of abilities may best be cultivated in the schools.

4. Technique Devised for Measuring Observational Learning

a. *Types of Observation Studied.* The ability to observe and to report accurately upon the things in the external world about us involves the use of a very complex group of mental functions, as everyone knows. This complicates the problem of measurement and training immensely because so many mental factors are involved. There are, for example, at least four distinct types of observation: (1) A *purposive or inquiring type*, where the observer has a distinct goal idea or purpose in mind when he makes his observation, and therefore proceeds in his noting from particular points of view. (2) *Involuntary or forced observation*, where a stimulus makes its appearance suddenly and forces the subject's attention. Here there is no goal idea to guide the process; there is no opportunity for mental or physiological preparation or adjustment. The information comes, if at all, as a distinct surprise. (3) We have in the third place a *passively expectant type* of observation. Here we purposely try to rid ourselves of all definite viewpoints, the observer having before him only the general or rather indefinite purpose of noting *everything* that happens; he takes note of every sort of stimulus that comes. The mental predisposition given by a goal idea is wholly lacking and is actually disadvantageous in this type of observation. The only purpose which the observer has in mind in this sort of observation is the intention to assume the general attitude of an observer. He, therefore, refrains from any special adjustment and merely holds himself ready to observe and interpret whatever happens. (4) A fourth type of observation may be called *scientific observation*, which really combines the first or *inquiring* with the third or *passively expectant* type. A scientist working on a problem has certain definite things in mind which he is looking for (purposive or inquiring observation), but he also holds himself ready to observe and to take accurate note of every detail which may prove constructive or significant.

b. *Nature of Experiments Described.* Only three of these types of observation were studied in our experiments, the first, third, and fourth. The second could be measured and studied by a slight change in our method and the conditions imposed in our experiments. For this we devised four types of tests: Experiments A, B, C, and D.² In all four experiments the subjects were required to observe pictures of objects and things which were thoroly familiar to all. In Experiment A, pictures of familiar objects were used as material for observation, and the subjects were instructed before the observation began to note all important things about the pictures, even the minutest detail, so that the identical group of pictures observed might be correctly identified and marked in a second list of pictures which contained in addition to the same pictures shown in the stimulus group a number of pictures that were similar, together with a group of pictures that were entirely unlike any of those seen in the original group. In this experiment the subjects had only to observe the details of the pictures in the stimulus group accurately enough to be able to identify them in the second group. No actual learning or mem-

² For the observational materials and directions used in the twelve tests of these experiments see section 7 of this report, pp. 55-106.

ory was required, and the actual points of difference were not called for. Our directions made this of the inquiring or purposive type as we told the subjects in our directions just what to look for or do.

In Experiment B the subjects were asked to observe a rather complicated picture for one minute and directed to note everything about the picture so that immediately afterwards they could state in writing everything that they had seen in the picture and answer accurately a list of fifty questions which we asked concerning the objects found in the picture. This experiment, which is a modification of Professor Stern's "Report Experiment", demanded of our subjects, in addition to an accurate noting of the details while the picture was exposed, that the details be sufficiently impressed or learned to enable the subjects to recall them accurately in the spontaneous reports asked for immediately after (20 seconds) the picture was removed, or so he could recall the details accurately in response to the questions that were asked about the picture immediately after the spontaneous report had been completed. That is to say, in addition to holding himself ready to note or observe everything found in the picture (*passively expectant observation*) the observer had to remember what he observed until it could be written down in his spontaneous report or until the questions relating to it had been answered on the folder placed in his hand.

In Experiment C the subjects were given a group of pictures of familiar objects which they were asked to observe very carefully even to the minutest detail, so that immediately afterwards, when shown a second group of pictures which had been changed in certain important respects from the pictures in the original group, they could state in what particular way or ways the pictures in the second group had been changed. This required not only noting all the important details of the picture in the stimulus group, but observing them so accurately that the subjects could point out in what particular way the pictures in the recognition group had been changed from those in the original or stimulus group. It required not merely accurate observation but accuracy of retention and recall. As in the other experiments, the observations were made with the problem definitely fixed in mind by the directions.

Experiment D was the same as Experiment A with the exception that the subjects were asked to observe a series of geometrical forms instead of pictures of familiar objects.

c. Subjects and Methods of Giving the Tests. To test the value of our method of measurement and the observational ability of different individuals and groups and to solve the other problems mentioned above, we selected three groups of college students composed of 120 individuals each, 360 in all, four groups in the local high school, and five sections in the grades, 830 subjects in all. Group I was composed of three sections of college students, 40 individuals in each, and was made an intensive training group. Group II was given a little less training in observation. Group III was made a control group and took all the tests and practices the same as the training groups, but without any of the special training in observation devised for the several training groups. The nine sections of these three groups were each given three practices in each experiment

(A, B, and C), nine practices in all. The different pictures and forms used in each of the three tests for a particular experiment were made, as nearly as possible, of the same degree of difficulty.³ But in order to insure that an equal number of individuals in each of the training and control groups made observations on material that was equally familiar and of the same degree of difficulty we gave the three pictures or forms for each experiment in a different order to the three sections of each group so that an equal number of individuals had the same form in the first, second, and third practice. To illustrate: the materials to be observed were given to the nine college sections in the order shown in Table I below.

In the high school we compared the initial ability and rate of improvement of freshmen and seniors for observing the materials used in each of our experiments. Seventy-five members of the freshman class (Group I) were given the same special training in observation given to the training groups in the university. The other 75 members of the freshman class and the 75 members of the senior class were used as control groups and took all the tests given the training group, but without the special training in observation devised for the training sections.

TABLE I

Group	Sections	Experiment A Practices or tests			Experiment B Practices or tests			Experiment C Practices or tests		
		I	II	III	I	II	III	I	II	III
I Intensive training	a	A-1	A-2	A-3	B-2	B-3	B-1	C-3	C-1	C-2
	b	A-2	A-3	A-1	B-3	B-1	B-2	C-1	C-2	C-3
	c	A-3	A-1	A-2	B-1	B-2	B-3	C-2	C-3	C-1
II Training	a	A-2	A-3	A-1	B-3	B-1	B-2	C-1	C-2	C-3
	b	A-3	A-1	A-2	B-1	B-2	B-3	C-3	C-1	C-2
	c	A-1	A-2	A-3	B-2	B-3	B-1	C-3	C-1	C-2
III Control	a	A-3	A-1	A-2	B-1	B-2	B-3	C-2	C-3	C-1
	b	A-1	A-2	A-3	B-2	B-3	B-1	C-3	C-1	C-2
	c	A-2	A-3	A-1	B-3	B-1	B-2	C-1	C-2	C-3

These groups were each divided into three equal sections and the materials for observation given in the same order as indicated for the several college sections and groups, so that an equal number of subjects were required to observe each set of pictures first, second, and third in each experiment, counteracting completely any differences which might arise because of any inequality in the difficulty of the materials to be observed. A class of 45 juniors made up our fourth high school group, which was used as a regular training group.

Two hundred sixth grade pupils in the Bloomington schools were

³This was determined by a series of preliminary experiments carried on while the several test forms were being constructed and the general method of the investigation worked out.

also given three practices with the materials used in Experiments A and C. These pupils were divided into five sections of 40 pupils each. Groups I and III were given special training in observation for a few minutes each day before the second and third test in each experiment. The same method of instruction was used as arranged for the high school and college groups, but the wording of the instructions and directions was changed to adapt them to young children. Sections II and IV of the sixth grade groups were used as control groups, and took all the tests the same as the training groups, but without any special training in observation. Group V was used as a control group in Experiment A, and then given special training before taking the last two practices of Experiment C. For these sixth grade subjects the materials were given to all sections in the same order, the harder forms in each experiment being given first, the exact order being A-2, A-3, A-1, C-2, C-3, C-1.

d. How Initial Ability to Observe was Ascertained. In all these groups and experiments the initial ability to note and observe the type of material presented in our experiments was determined for the several sections and groups by having them take the first regular test in each experiment (type of material) before any of the regular practices or any of the special training arranged for the training groups was begun.

e. Determining the Native Mental Endowment of the Several Sections and Groups. The native mental endowment of each member of the several sections and groups was determined by giving each section the Indiana University Standardized Intelligence Test, commonly known as the Pressey Cross-Out Tests, before the observation tests were begun. In this manner the intelligence rating of each individual and group was determined before any of the observation tests were begun. Control groups were then selected whose mental rating was slightly superior to that of the training groups because it was believed that the best mentally endowed individuals would show the greatest initial ability to observe and, perhaps, also show greater improvement in response to the special practice in observation arranged in the experiments.

f. Data on Improvement in General Ability to Observe. To try to get some indication of any general effect which the special training in observation arranged for the several training groups might have, we gave each of our training and control groups the first test of Experiment D, after all practices involved in Experiments A, B, and C had been taken. This required the subjects to observe materials of an entirely different sort than those used in the regular practices, and by comparing the final ability to observe the material given in Experiment D with the initial score made in Experiment A it was believed that we would be able to get some indication of the general improvement made by our various training and control groups as a result of all the practice and training obtained while observing the materials given them in Experiments A, B, and C. If our several training groups would show a higher score on this final test, it would be some indication, it was believed, of a general improvement in ability to observe.

g. Measuring the Effect of a Goal Idea. The effect which a definite goal idea or purpose actually produced upon ability to note and report

facts accurately and completely was studied by asking the members of each section after the third and last test of Experiment C (the experiments were given in this order, A, B, and then C), to mark in the recognition list of pictures the position which each picture had occupied in the original or stimulus group of pictures. This task called for a report on the observation of facts which the subjects had not been definitely asked to take note of in the directions given them in the regular tests. When this had been completed and the papers taken up, a second list of pictures, similar to those observed in the third test of Experiment C, were given to the subjects as a final test. They were asked to observe this group of numbered pictures carefully, noting and remembering the exact location of each individual picture in the total group so that immediately afterward when shown a second disarranged group of the same pictures they could mark the position which each of the pictures in this second disarranged group had occupied in the original or stimulus group.

5. Problems Investigated by Means of This Technique and General Results

By these methods and tests we were able to ascertain first whether the ability to observe could be accurately measured by a method that would be practical for use in the schools; second, to determine whether or not the group of mental functions involved in this type of reaction could be improved by means of the special training which we devised; third, whether individuals with all grades of native mental endowment found in the various college, high school, and grade groups which took part in our experiments were amenable to this training and to the same degree; fourth, whether the individuals which composed the junior and senior college groups, our college freshmen, the members of the freshman and senior classes in high school, and the pupils in the sixth grade possessed the same initial ability to observe and report upon the type of material presented for observation in our tests, it was believed that the data on the latter point might throw some interesting light on the probable effect which the present school curriculum and instruction was having upon the cultivation of the group of mental functions involved in observation and accuracy of report; fifth, by comparing the rate and amount of improvement made by our various training groups who belonged at these several school levels, it could also be determined whether or not the same method of training would be effective for all; this it was believed might throw important light on the problem of how this group of abilities could be cultivated if a reliable and practical method of measuring progress in this type of learning could be devised and standardized; lastly, by comparing the initial observational ability of the various groups of college students who have done major work in certain university subjects such as science, foreign language, history, English, and the like, it was thought that some indication might be obtained as to whether certain of these subjects⁴ contribute more to the development of this group of

⁴To obtain further information on this point it is proposed to measure by means of our tests the initial observational ability of all members of the present senior class in the University, four hundred men and women who are particularly interested in each of these subjects and who have had three or more years of special training in that particular

abilities than other subjects. At any rate, it was believed that an accurate and practical method for measuring observational ability would open the way for a more accurate study of these and other important problems of great theoretical and practical significance.

A tentative report of the more important results which we obtained by the use of these tests on the 830 cases tested thus far will be presented in the next two reports. A more accurate idea of the tests and the group method of measuring observational ability which we devised may be obtained if we demonstrate the method by having you take the tests. The tests used in Experiment A can be given to a class of 30 or 300 individuals in six minutes. A test by method C requires about ten minutes to give. The tests in Experiment B require about thirty minutes. I will demonstrate only the methods used in Experiments A and C.

The blanks will be passed out by the assistants face up and under no circumstances are you to turn over these folders or look on the inside until you are directed to do so. All instructions given by me must be followed implicitly. This is one of the conditions of the experiment which must be strictly observed.⁵

6. Method of Determining the Various Elements of Gain

The method used to determine the various channels thru which improvement in observation and report may come—the different elements which make up the improvement in the score which was made as a result of the training and practice,—is an adaptation of the method of handling and interpreting similar data worked out by Stern, Bernstein, Netschajeff, Borst, Oppenheim, and others in their various Report Experiments.⁶ By obtaining an accurate measure of the number of details correctly reported, the number of right details omitted, the number of wrong details added to the report, and the number of details that were incorrectly reported, the number that were felt to be correct and therefore sworn to, the number sworn to and right, the number felt to be correct yet wrongly observed and reported, and comparing these with each other and with the total number of items to be observed and reported, it was possible to deduce regular formulas for determining both the relative and absolute amount of gain in each of the following elements of the observation and report process.

subject. It is generally assumed that a study of science and well directed laboratory work gives special training in observation and accuracy of report. By comparing the initial ability to observe of English, history, language, and science majors, data could be obtained which might throw interesting light on how the ability to observe and report accurately upon any materials which are to be observed may best be cultivated. This would of course not enable us, with any degree of assurance, to say which college subject gave the most help in this respect unless these same individuals had been tested in their freshman year. This may, of course, be done in the future in any college or university if a reliable measurement for observational learning is devised and standardized.

⁵ The audience was then given one test in Experiments A and C. Each subject scores his own paper and calculates the record made on the test according to the method of interpreting the data described in the next section. The directions and various test forms used in the entire investigation are reproduced in section 7 below.

⁶ See their studies referred to below and G. M. Whipple's *Manual of Mental and Physical Tests*, Part II, pp. 386-387. See also pages 407-408 for a selected bibliography on Report Experiments.

1. The completeness of the report both before and after the practice. This was determined by ascertaining the per cent of details which

$$\frac{R}{P}$$
should have been observed that were reported correctly. —
2. Incompleteness of observation and report determined by ascertaining the per cent of details that should have been observed and correctly reported, that were omitted. —

$$\frac{O}{P}$$
3. Range of observation and report determined by dividing the total number of details that were reported by the total possible number. —

$$\frac{N}{P}$$
4. Falsity of observation and report determined by ascertaining the per cent of details that should be observed and reported that were wrongly reported. —

$$\frac{F}{P}$$
5. Incorrectness of observation and report determined by dividing the number of incorrect observations and reports made, the new and different details added in the report, by the total number that were to be observed or total possible number. —

$$\frac{W}{P}$$
6. The accuracy or correctness of the observations and reports actually made, determined by ascertaining the proportion of all details reported that were correct. —

$$\frac{R}{R + F + W}$$
7. Inaccuracy of observation and report determined by dividing the total number wrong (added and false or details incorrectly reported) by the total number of details that were reported. —

$$\frac{F + W}{N}$$
8. Strength of the subjective feeling of certainty (assurance) shown by tendency to swear to the correctness of the observations and reports, —, where S signifies the total number of reports felt to be correct and N the total number of details reported.

$$\frac{S}{N}$$
9. Reliability of this feeling of certainty determined by ascertaining the per cent of items that were felt to be correct (i.e. whose correctness was sworn to) that were correctly observed and reported.

$$\frac{S \cdot R}{N}$$
10. The trustworthiness of this subjective feeling of certainty about the observations and reports (warranted assurance) determined by

dividing the number sworn to and correctly reported by the total

$$\frac{S.R.}{N}$$
 number reported. —

11. The unreliability of this subjective feeling of certainty (unwarranted assurance) shown by dividing the number sworn to and wrong by the total number of details reported and felt to be correct.

$$\frac{S(F+W)}{N}$$

12. The real reliability of this subjective feeling of certainty (assured accuracy) determined by dividing the number of items sworn to and correctly observed and reported by the total number of items

$$\frac{S.R.}{R}$$
 that were correctly observed and so reported. —

A reliable subjective censor for our observations and reports is without doubt a very important and desirable thing. Any defect or weakness along this line and all improvement in the trustworthiness of this factor of the observation process or in the ease with which it works and comes to the aid of the observer would seem to be an important finding which might help us to determine why some people are such poor and unreliable observers and others are so very good.

In this manner improvement tables and charts were worked out showing the initial record which our several sections and groups made in each of these respects, also the amount of gain which they made in each of these elements of improvement as the practice and training proceeded. A few of the more important facts revealed by this method of interpreting our data will be presented for your consideration and criticisms in the next two reports on this subject. We shall be glad to receive any suggestions and criticisms of the problems and method here reported, either now or after the other reports have been presented.

7. Test Forms and Directions Used in the Various Experiments

a. Acknowledgment

Suggestions and help for the construction of the various test forms used in our several experiments were obtained from sources too numerous to acknowledge in detail. For Experiment B, the form of picture test used by Stern, Rosa Oppenheim, Breukink, and others was adapted for group use. But an entirely different set of pictures was selected and the questions for the deposition reports were so arranged that the 50 questions asked demanded the use of five different categories of observations, 10 for objects and attributes, 10 for time and place relationships, 10 for colors, 10 called for causal and interpretative observations, and 10 for action. Ten suggestive questions were also asked, two relating to each of the five categories of observation just mentioned.

The suggestion for Experiments A and D was obtained from A. Netschajeff's investigation, *Über Vorstufung*, Berlin, 1904, reviewed in *Zeitschrift für Angewandte Psychologie*, Vol. 4, pp. 335-346. Form D-1 is an exact reproduction of the geometrical forms he used in his experiments. The other 60 forms were designed by us.

The three forms for Experiment A are similar to D save that a group of three pictures of familiar objects was arranged and used instead of geometric forms. In selecting and arranging the 90 sets of pictures used in Experiment A we used con-

siderable material that had already proved successful in other psychological tests. All materials were arranged according to certain principles which we followed in the construction of each of the 12 test forms.

The general method which we used in Experiment C is based on the experiments made by A. Bernstein and T. Bogdanoff, "Eperimente uber das Verhalten der Merkfähigkeit bei Schulkinder", *Beiträge der Aussage*, Vol. 2, pp. 115-134. Our form C-1 contains the same set of pictures used in their experiments. The materials used for observation in the other two forms of Experiment C were constructed by us. For the pictures of familiar objects to be observed we drew again from our own and other mental tests.

In the construction of the directions to subjects and in arranging a method of training we drew unhesitatingly on the methods, results, and interpretations contained in the various published investigations on "Aussage" Experiments. To all these investigators, more especially to those whose methods and results we found directly serviceable, we acknowledge our indebtedness for many valuable suggestions and much concrete help.

EXPERIMENT A. RECOGNIZING PICTURES OF FAMILIAR FORMS

(1) Various Test Forms Devised and Used for Observation Materials— Experiment A

For Experiment A the following three test forms were constructed after considerable preliminary experimenting and used in the three regular practices given with this method and material.

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Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT A-1
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

Name..... Age..... Sex.....

Class..... Father's Occupation.....

School Standing..... Favorite Study.....

Range..... Accuracy..... Certainty.....

Correctness of Observation and Report.....

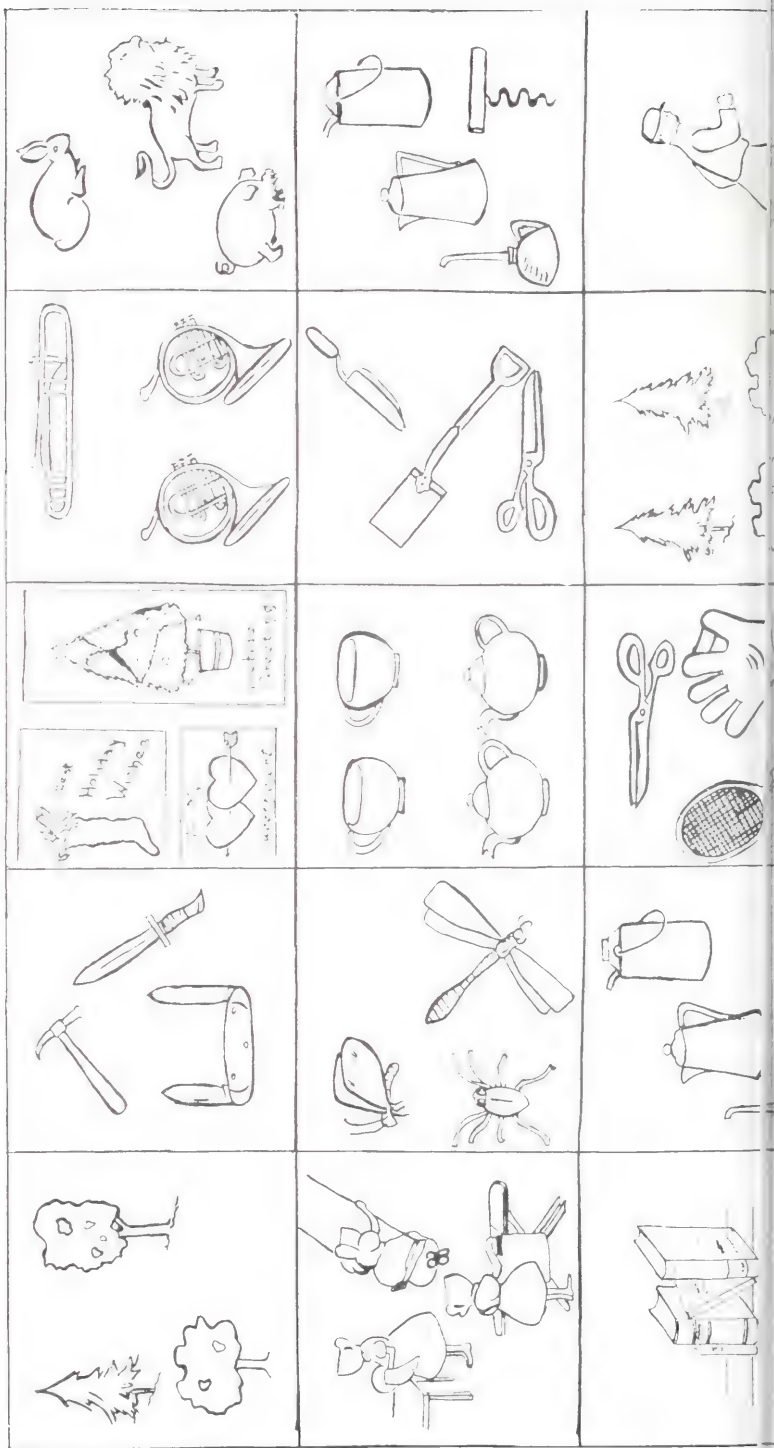
EXPERIMENT A-1

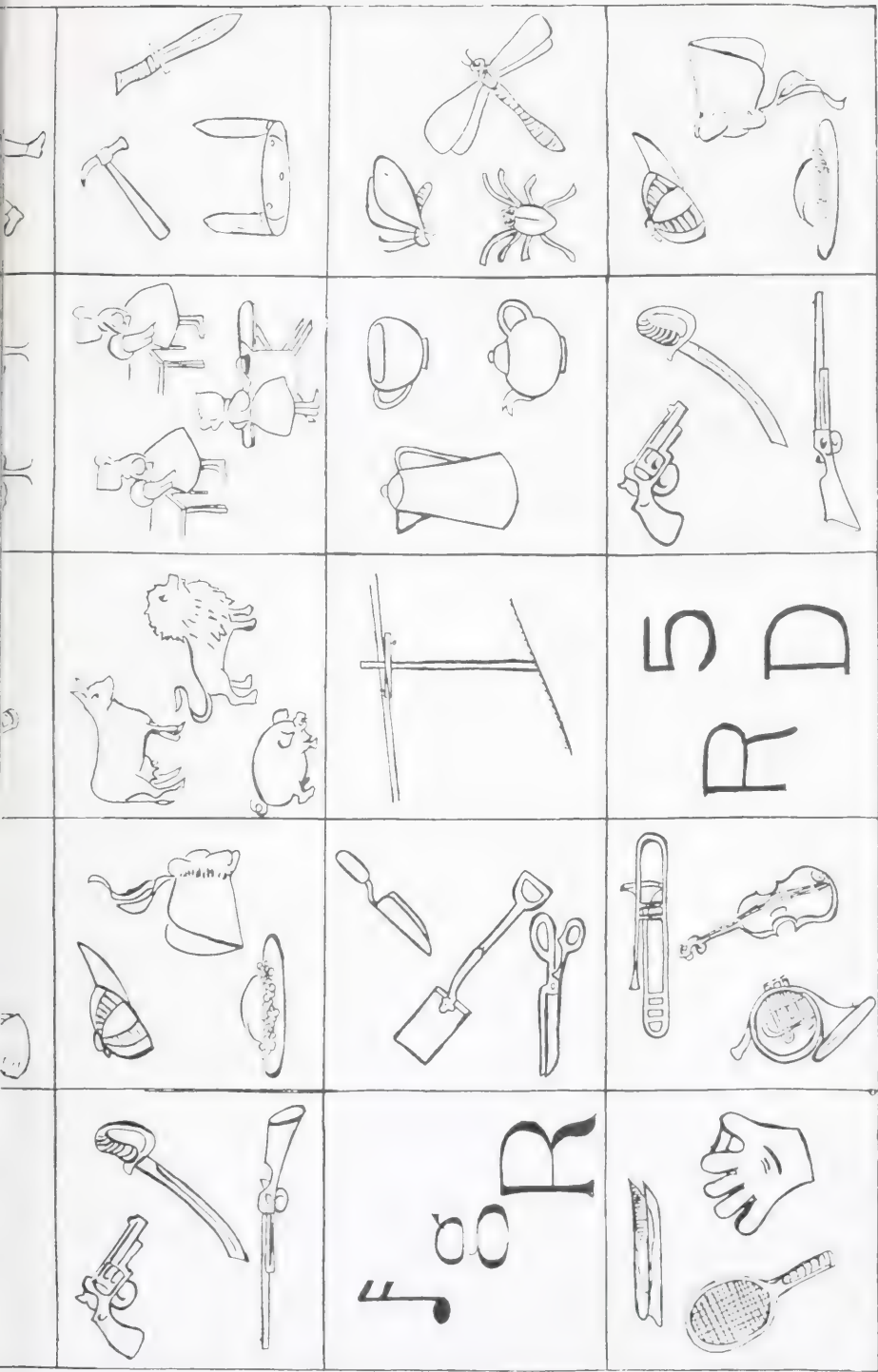
Directions

Mark each picture with a cross (X) that is exactly like one seen on the back of this folder.

Time.....

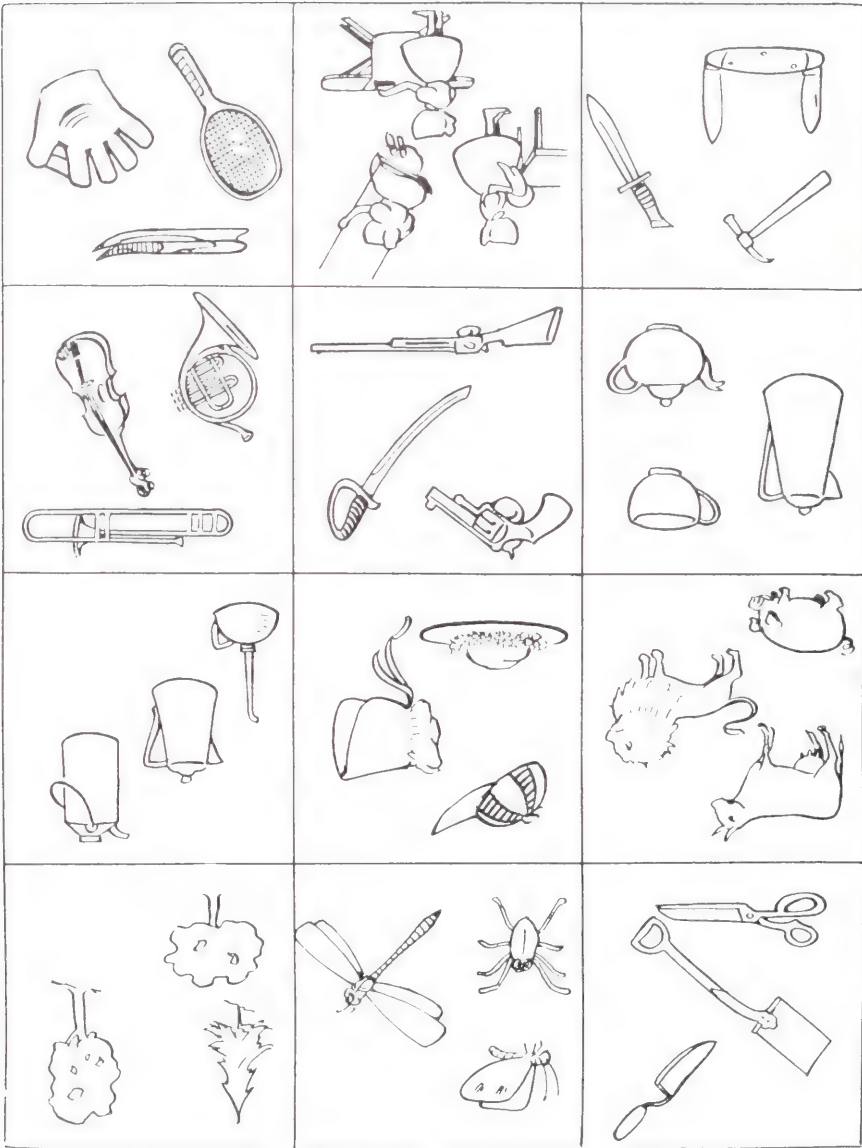
RECOGNITION





TOTAL NUMBER DETAILS REPORTED..... No. Correct..... No. Omitted.....

No. Corrections..... No. Wrong.....



OBSERVATION
Experiment A-1

Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT A-2
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

Name..... Age..... Sex.....

Class..... Father's Occupation.....

School Standing..... Favorite Study.....

Range..... Accuracy..... Certainty.....

Correctness of Observation and Report.....

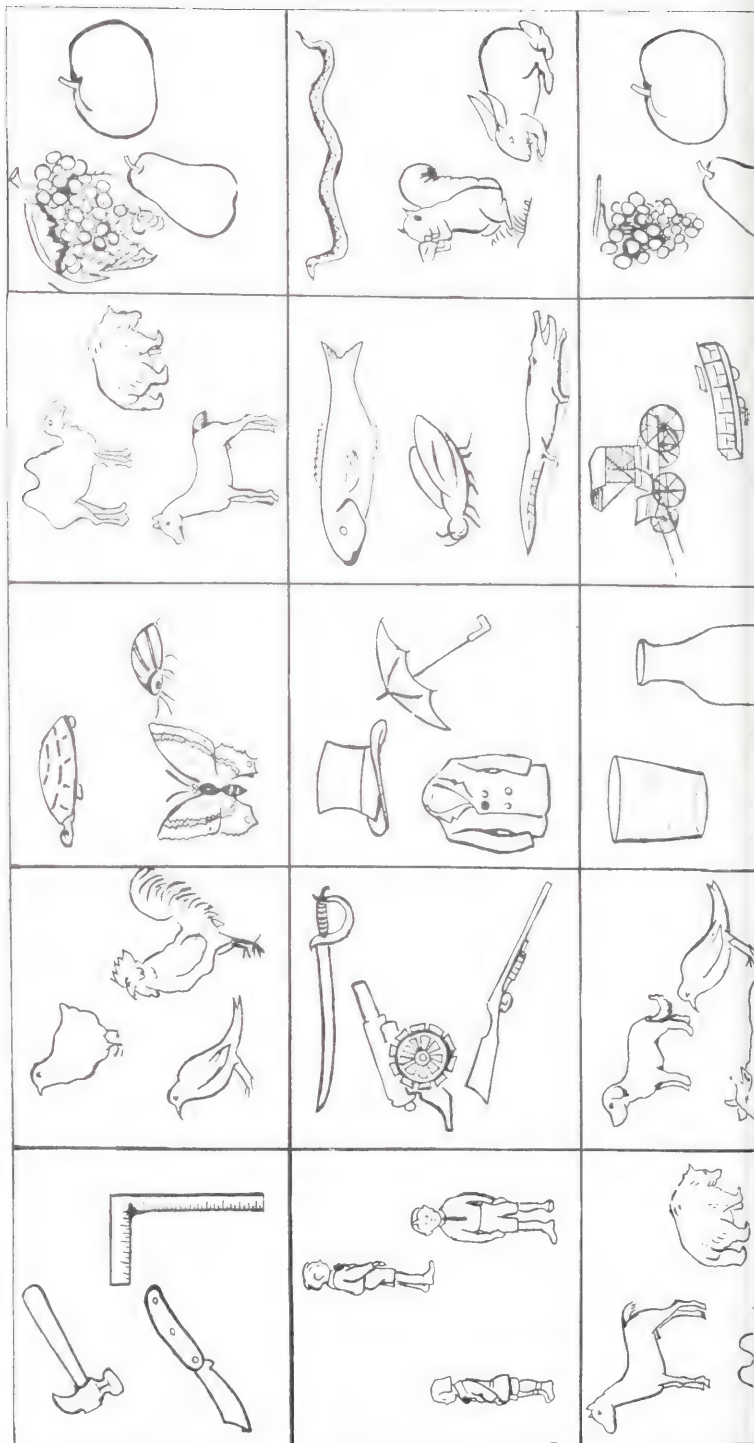
EXPERIMENT A-2

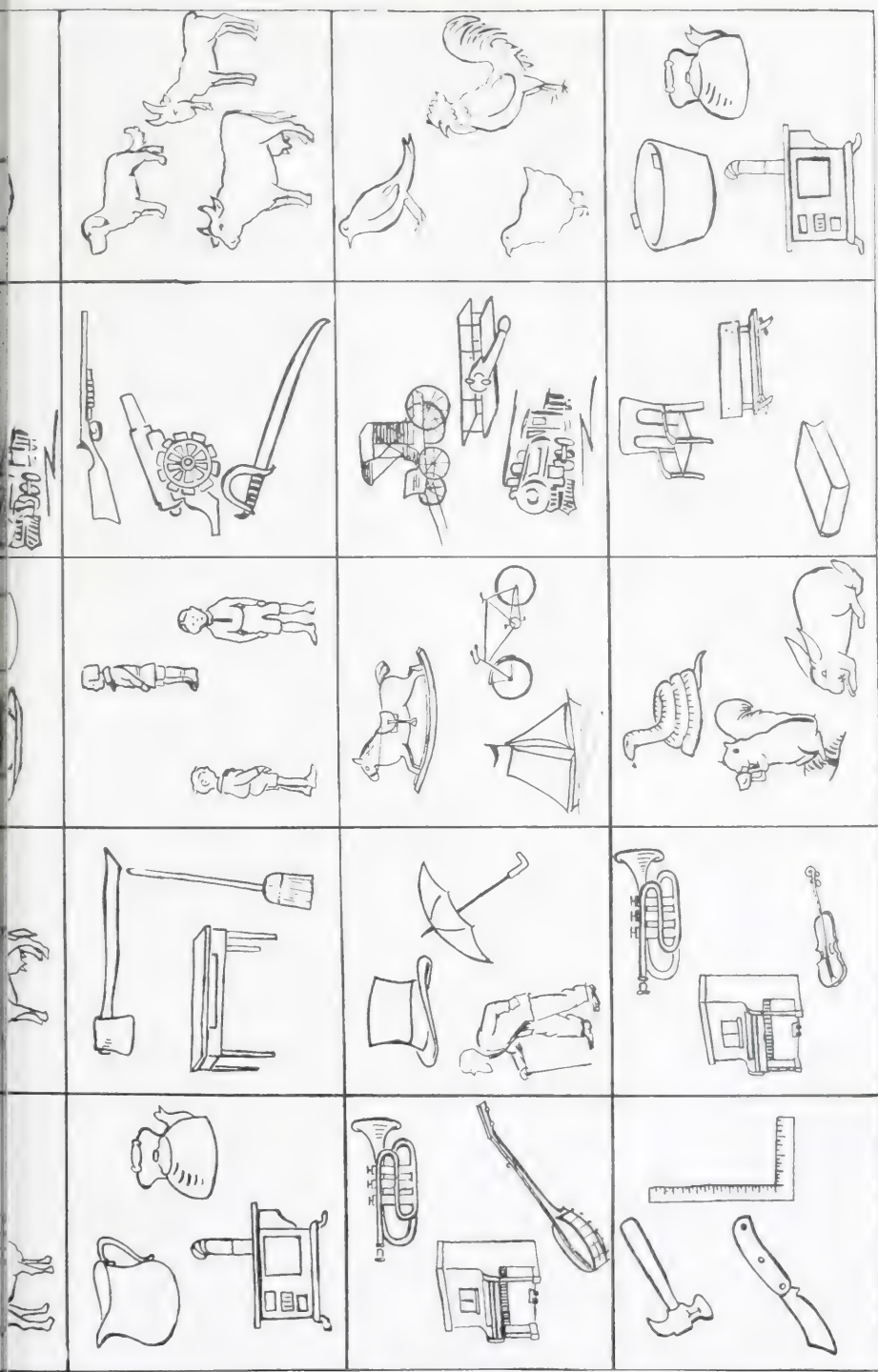
Directions

Mark each picture with a cross (X) that is exactly like one seen on the back of this folder.

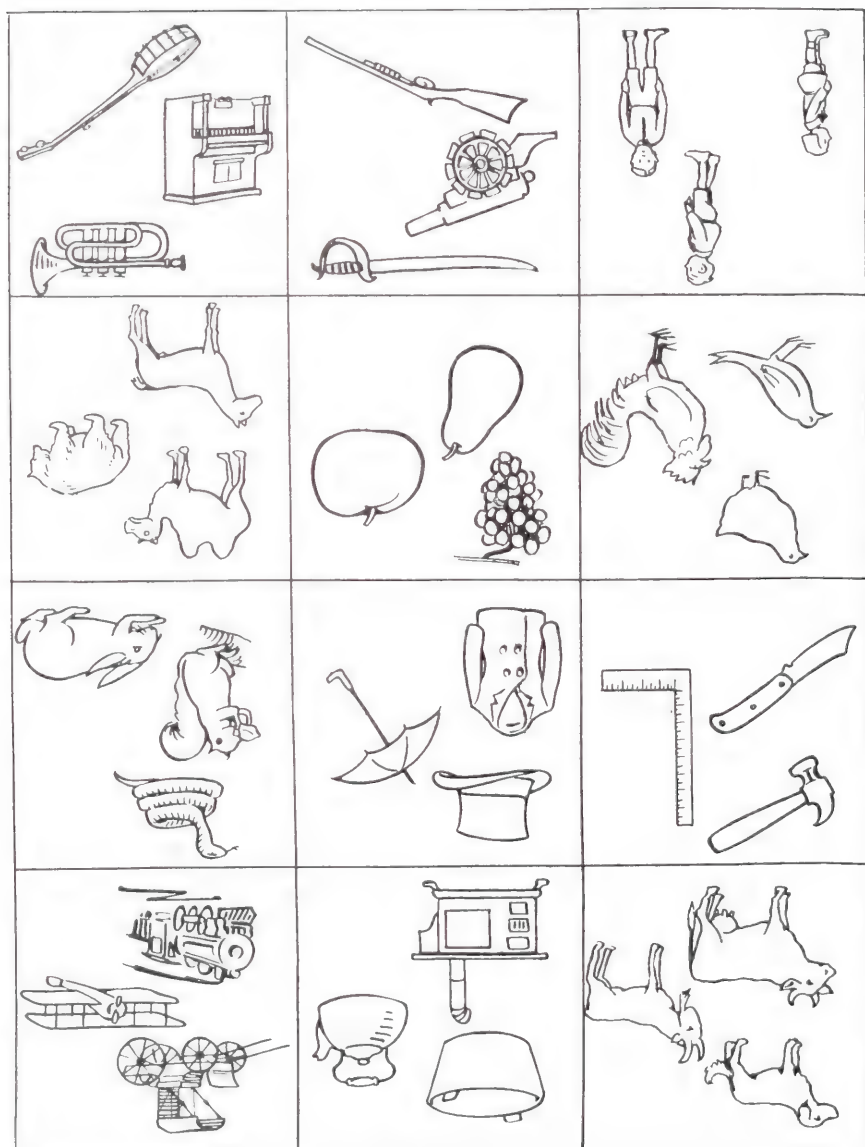
Time,

RECOGNITION





TOTAL NUMBER DETAILS REPORTED..... No. Correct..... Sworn..... No. Omitted.....
 No. Corrections..... No. Wrong.....



Experiment A-2
OBSERVATION

Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT A-3
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

Name..... Age..... Sex.....

Class..... Father's Occupation.....

School Standing..... Favorite Study.....

Range..... Accuracy..... Certainty.....

Correctness of Observation and Report.....

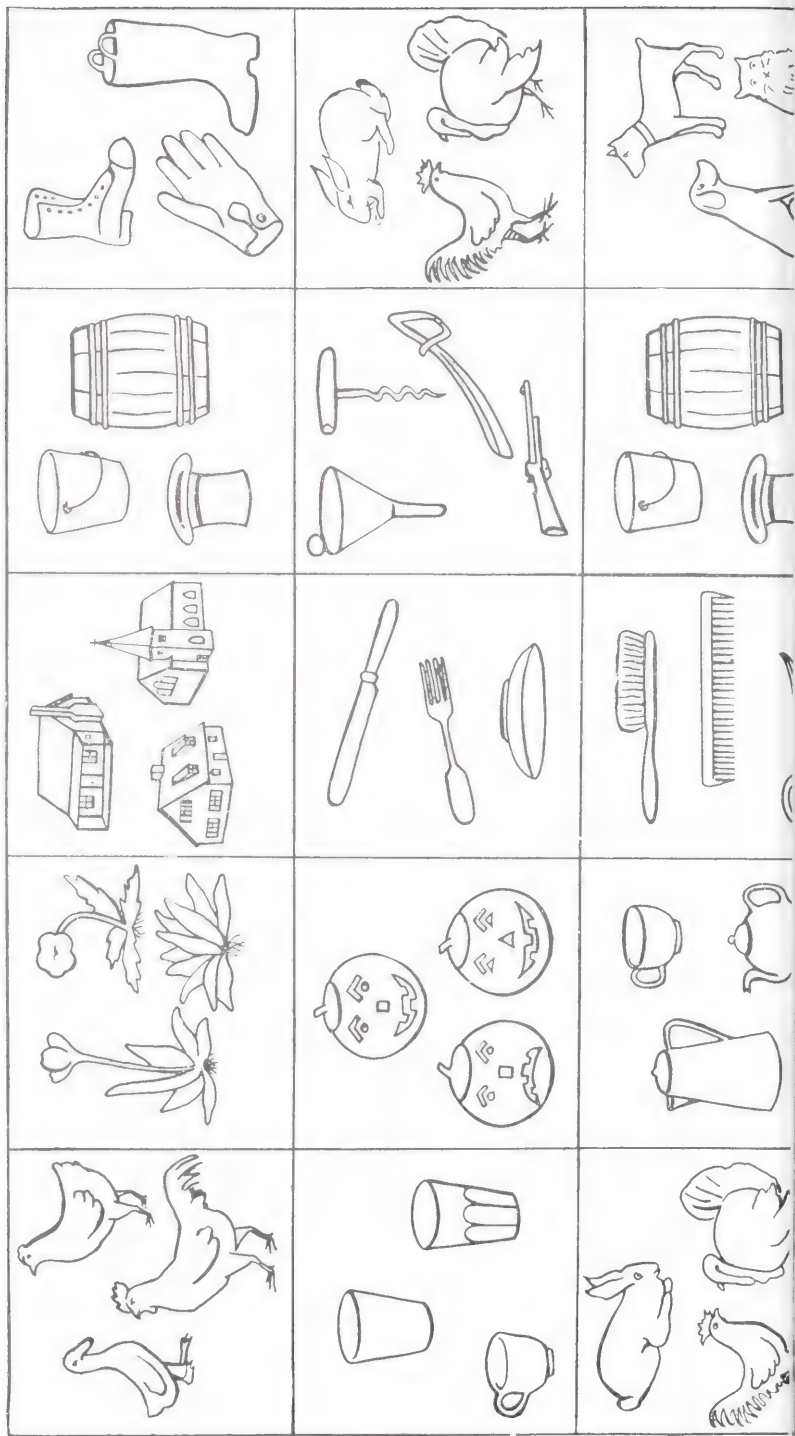
EXPERIMENT A-3

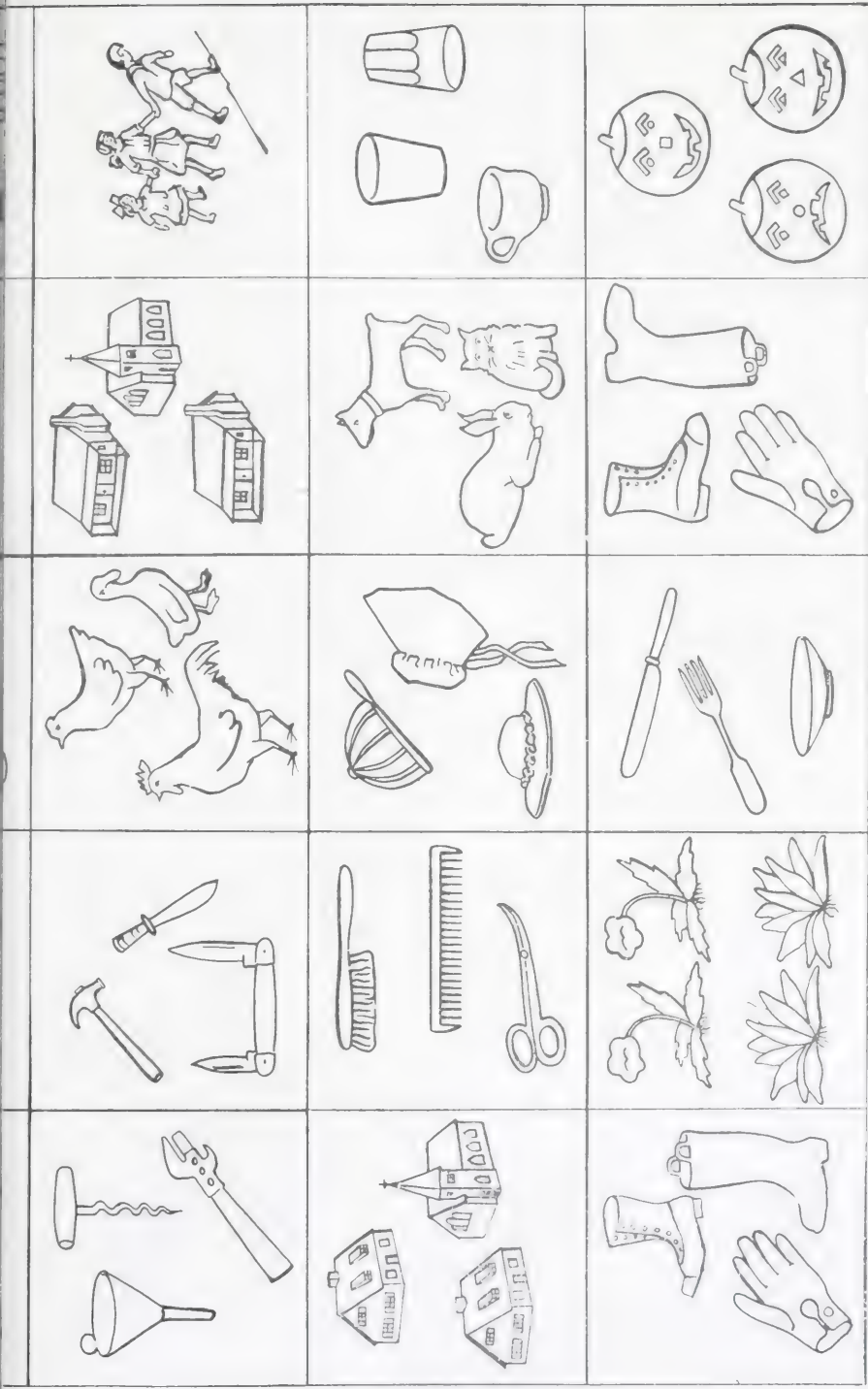
Directions

Mark each picture with a cross (X) that is exactly like one seen on the back of this folder.

Time.....

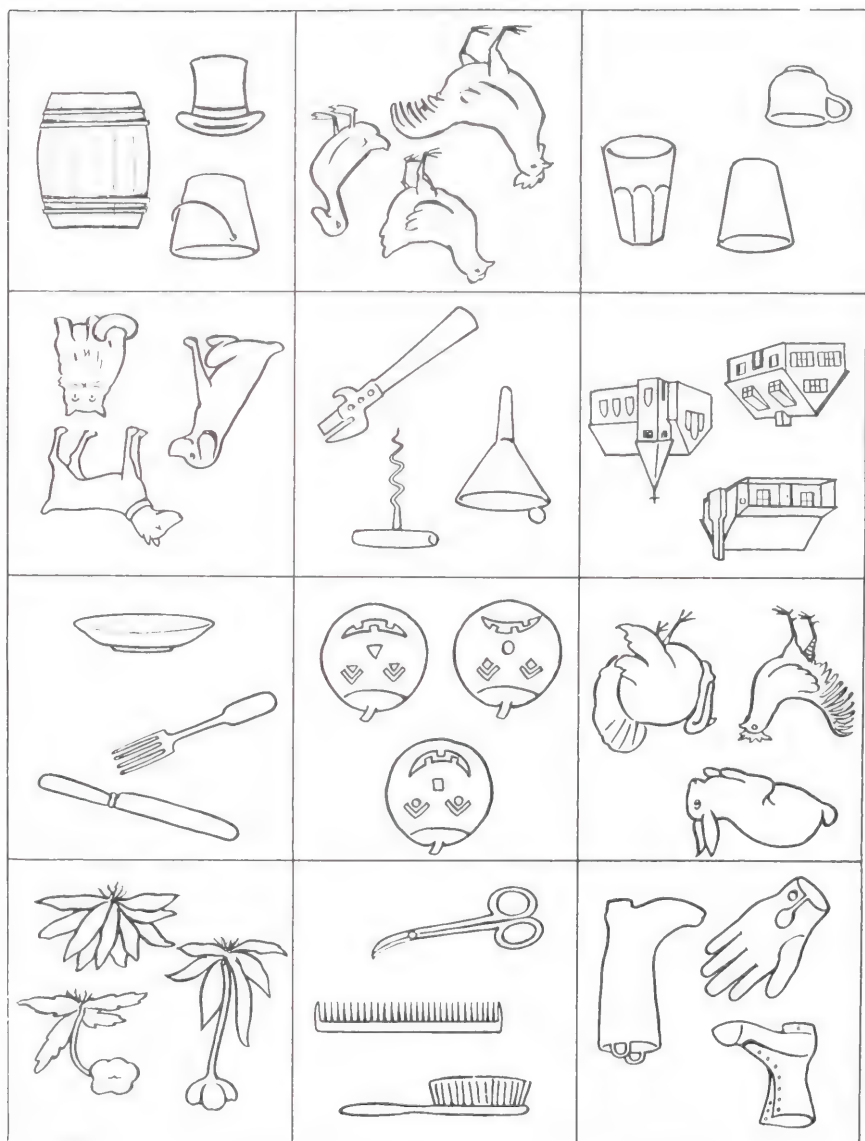
RECOGNITION





TOTAL NUMBER DETAILS REPORTED..... No. Correct..... No. Omitted.....

No. Corrections..... No. Wrong.....



Experiment A-3
OBSERVATION

(2) Instructions Given to All Sections and Groups in the First Test of Experiment A

In each test before any blanks are given out the students are cautioned that under no circumstances are they to turn over or open the folders until they are directed to do so by the experimenter. All subjects provide for each test the data called for on the face of the blank: name, age, etc. When this is completed the experimenter says:

"The purpose of this experiment is to try to find out how well you can observe and report what you have seen. I am going to show you a number of groups of pictures placed in small black squares or little frames. Examine these carefully in order to impress upon your mind everything about each of these pictures, for immediately afterwards you will be shown a second group of pictures and asked to tell which of the pictures in this second list are like the pictures seen in the first group. You will be given thirty seconds to look at the pictures, which is plenty of time to see everything about them, but you must attend closely and work hard in order to see all that is in the pictures in the time that is allowed you. Ask no questions.

"Now take hold of the lower right hand corner of your folder, thus When I say 'go', but not before, turn the folder over thus (demonstrates) and study your pictures as directed. Get ready. Go!" After thirty seconds the experimenter says: "Stop, turn your folder over face up as it was before."

Experimenter waits 20 seconds, then continues: "Now open your folder to the list of pictures on the inside. (After the folders have been opened the experimenter continues.) Now everyone attention! Make a cross in the square of each group of pictures in this list that is exactly like one of the groups of pictures seen on the back of your folder; draw also a circle around the cross in the square of each set of pictures that you *know* is exactly like one of the sets seen on the stimulus sheet, i.e. whose identity you are so sure of that you would be willing to swear it was the same. When you have finished record at the top of the page the time you consumed in identifying the pictures, and hand your paper to one of the assistants. Don't make any erasures on the blank; if you make a mistake and want to correct it cross it out, thus Remember under no circumstances are you allowed to refer to the pictures on the original stimulus sheet."

The experimenter keeps track of the time consumed by marking the time in half-minutes on the blackboard, starting with 1 and continuing until all members of the class have finished. As soon as the subjects have finished they record the last number placed on the board before they got thru. This procedure is explained before the experiment is begun. The papers are taken up by an assistant as soon as finished.

(3) Directions for All Training Sections and Groups, Second and Third Test of Experiment A

"As in the first test of this experiment the blanks will be passed to you face up, and under no circumstances must you turn them over or look on the inside of the folder until directed to do so. This is one of the conditions of the experiment and must be strictly adhered to. Fill in on the first page the data called for, so your own individual report may be accurately and easily identified." When this has been done the experimenter continues:

"The purpose of this experiment is the same as in the experiments given you last week. We are trying to determine how well people can observe and report what they see and how much this ability can be cultivated and improved by practice. You will recall that in the first test on Friday you were shown a series of pictures which you were asked to observe carefully so you could recognize each group of pictures if it occurred in a second group shown you immediately afterwards. You have just corrected and studied the report which you made in this first experiment and found that a complete and correct observation is the exception rather than the rule. Most of you made many mistakes in this first experiment. You failed to note many important details about the pictures in the first list. Some of you marked pictures in the second list which were not seen in the first group of pictures at all. Nearly everyone failed to recognize some of the pictures that were actually seen in the first group. But each one of you can *greatly* improve your ability along this line. The reason you are not better observers than you are is, in all probability, due to the fact that you did not know how inaccurate and incomplete your ability along these lines really is, and to the

(under the fact that you have not been genuinely interested in improving yourself in this particular respect. It has been demonstrated by actual experiment that one can improve his ability to observe if only he will make up his mind to do so, and is determined to find out for himself the best ways to do it. You can, therefore, really improve your present ability to observe and report upon the sort of material which we will provide and one of the purposes of these experiments is to ascertain how much.

"In the experiment today I am going to show you another set of pictures framed in small black squares like those shown you in the first experiment. Observe them carefully in order to impress upon your mind everything about the pictures, for immediately afterwards you will be asked to mark with a cross in a second group, each set of pictures you saw in the first group. You will be allowed 30 seconds to look at these pictures; that is not very long, so pay close attention so you may impress upon your mind everything about the pictures which will enable you to identify them in the second list. When I say 'go' you are to make a cross in the square containing each set of pictures in this second list which is exactly like one of the sets seen in the first list. Draw also a circle around the cross marking each set of pictures that you are *sure* is exactly like one of the sets observed in the first list, i.e. which you would be willing to swear you have marked correctly. Try to improve your record as much as you can and when you have finished, record at the top of the page the time spent in identifying the pictures.

"Now take hold of the lower right hand corner of your folder and when I say 'go', but not before, turn over your folder thus . . . and observe the pictures as directed. Get ready. Go!" After 30 seconds say "Stop, turn over your folder *face up* as it was before." Wait 20 seconds, and say, "Now open your folder and mark the pictures as directed."

(Experimenter marks the time on the board by half-minute intervals as in the first test.)

(4) Directions Given to All Control Sections in Tests II and III— Experiment A

"As in the previous experiments the blanks will be passed out to you face up, and under no circumstances must you turn over these blanks or look on the inside of the folder until directed to do so. This is one of the conditions of the experiment and must be strictly adhered to.

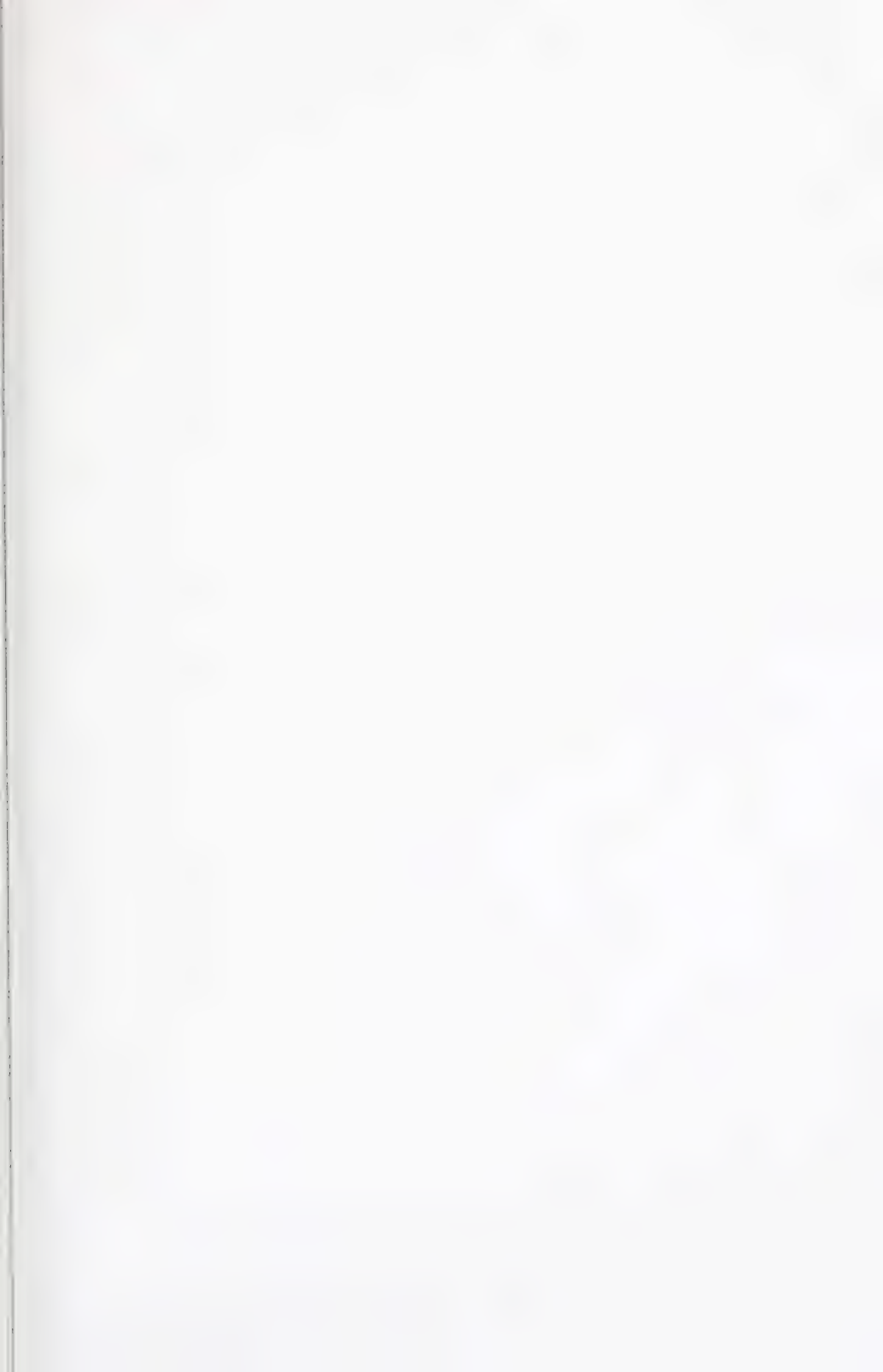
(When the blanks have been passed out and all the data called for on the front page has been filled in, the experimenter continues.)

"The purpose of this experiment is the same as in the other experiments. We are trying to determine how well people can observe and report what they see. Today I am going to show you some more pictures placed in small black squares or little frames. Examine these carefully for immediately afterwards you will be shown a second group of pictures and asked to mark with a cross each set of pictures in the second group, which is exactly like one of the sets shown you in the first group. You will be given 30 seconds to look at the pictures. That is not very long, so pay close attention in order to impress upon your mind everything about the pictures which will enable you to identify them in the second list. When I tell you to open your folder you are to make a cross in the square containing each set of pictures in this second list which is exactly like one of the pictures seen in the first group. Draw also a circle around the cross marking each set of pictures that you *feel sure* is exactly like one of the groups of pictures seen in the first list, so sure that you would be willing to swear in court it was the same. When you have finished, record at the top of the page the time you spent in identifying and marking the pictures. Don't make any erasures; if you want to correct a mistake mark it out, thus

"Now take hold of the lower right hand corner of your folder and when I say 'go', but not before, turn it over, thus (experimenter illustrates method of turning) and observe everything about the pictures as directed. Get ready. Go!"

After 30 seconds the experimenter says: "Stop, turn your folder back face up as it was before." He waits 20 seconds, then says: "Now open your folder and mark the pictures as directed."

The experimenter marks time on the blackboard every 30 seconds, the subjects recording the last number written when they have finished the test.



EXPERIMENT B. THE PICTURE TEST IN EXPERIMENT B

(1) - Various Test Forms and Materials Used for Observation

For Experiment B the following three test forms were constructed after a number of preliminary tests had been given with different pictures and methods to a preliminary group. The picture to be observed is in each case reproduced on the last page of the folder where the regular subjects wrote their spontaneous report in the group tests.

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Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT B-1
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

1. Name..... Age..... Sex.....
2. Class Father's Occupation.....
3. School Standing Favorite Study.....

Results

4. Spontaneous Report.

No. details reported..... No. correct..... No.
sworn to..... No. omitted..... No. correc-
tions..... No. wrong..... Range.....
Accuracy..... Certainty..... Correctness of
observation and report.....

5. Questions.

Total No. answered..... No. correct..... No.
sworn to..... No. omitted..... No. correc-
tions..... No. wrong..... Range.....
Accuracy..... Certainty..... Correctness of
observation and report.....

6. Reliability on Special Questions.

Total No. answered..... No. correct..... No.
sworn to..... No. omitted..... No. corrected
..... No. wrong..... Range.....
Accuracy..... Certainty.....

Experiment B-1

Directions

Answer in **regular order** as many of the following questions as you can. If you come to a question you can not answer write "I don't know". Finish the list as soon as you can and record time spent in answering the questions.

Questions

1. How many persons are there in the picture?
2. What are they doing?
3. What is the posture of the person on your right, sitting, standing or lying down?

4. Is he smooth faced, or has he a mustache or beard?

5. What is he doing?

6. At what is he looking?

7. What color is his coat?

8. What color is his shirt?

9. What color is his necktie?

10. Does he wear boots, shoes or slippers?

11. Where is his right hand?

12. Is he writing with pen or pencil?

13. Is he young, old, or middle aged?

14. How do you know?

15. What is his facial expression?

16. Does his mustache conceal his mouth?

17. Which of the men is nearest you?

18. What is he doing with his left hand?

19. What kind of a lamp is there in the room?

20. Is the man on your left young, old, or middle-aged?

21. How do you know?

22. Why is he smiling?

23. What is he doing?
24. At what is he looking?
25. Is he standing or sitting?
26. Why is he pounding the table with his fist?
27. Where is the spittoon with reference to the man on the left?
28. To what profession do these men belong?
29. How do you know?
30. Name the objects on the table.
31. Name the objects in front of the table on the floor.
32. What color is the wall?
33. What is the man on the left doing with his left hand?
34. How many hats are there in the room?
35. Locate them.
36. Describe them, stating kind and color of each.
37. Is there an umbrella in the picture?
38. Is it jet black or dark blue?
39. In what position is it?
40. What object is on your extreme right?
41. How is the table covered?
42. What do the pictures on the wall represent?
43. Is the rocking chair on your left or on your right?
44. What color is the lining of the hat on the table?
45. What color is the binding of the books?
46. Where is the ink bottle?
47. Can you recall the time indicated by the clock on the wall?
48. Where is the newspaper?
49. Isn't the object on the extreme right a fire place?
50. Is the valve open or shut?

Experiment B-1
SPONTANEOUS REPORT



Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT B-2
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

1. Name..... Age..... Sex.....
2. Class Father's Occupation.....
3. School Standing Favorite Study.....

Results

4. Spontaneous Report.

No. details reported..... No. correct..... No.
sworn to..... No. omitted..... No. correc-
tions..... No. wrong..... Range.....
Accuracy..... Certainty..... Correctness of
observation and report.....

5. Questions.

Total No. answered..... No. correct..... No.
sworn to..... No. omitted..... No. correc-
tions..... No. wrong..... Range.....
Accuracy..... Certainty..... Correctness of
observation and report.....

6. Reliability on Special Questions.

Total No. answered..... No. correct..... No.
sworn to..... No. omitted..... No. corrected
..... No. wrong..... Range.....
Accuracy..... Certainty.....

1. How many persons are there in the picture?
2. How is the room lighted?
3. What kind of floor has the room?
4. What article of clothing is on the floor?
5. Why do you think the ball of yarn happens to be on the floor?
6. Is not the house a new one?
7. Is there a lantern in the room?
8. Where is it?
9. What kind of a time piece is in the room?
10. Is it running?
11. How do you know?
12. What is the nationality of these people?
13. To what social class do they belong?
14. What is your idea as to the relationship between the older woman in the picture and the children?
15. Is not the woman in the foreground busy with her knitting?
16. What color is her skirt?
17. What color is her apron?
18. What jewelry does she wear?
19. What time of day is it and how do you know?
20. Why are there dishes on the table at this time of day?
21. Who is pouring the wine?
22. What is the old man doing?

Questions

Time.....

questions.

Answer in regular order as many of the following questions as you can. If you come to a question you can not answer write "I don't know". Finish the list as soon as you can and record time spent in answering the

Directions

Experiment B-2

23. Why?
24. Is he not wearing a red vest?
25. What is the man behind the table doing?
26. Is he smiling?
27. What color is his vest?
28. Why can you not see his feet?
29. What has he in his right hand?
30. What is he doing with the knife in his left hand?
31. What is the woman in the background doing?
32. What is the color of her scarf?
33. What is she stirring in a pan?
34. How many cooking utensils are there in the picture?
35. Where is the skillet?
36. Is there a pail in the room?
37. Where is it?
38. Where are the wine bottles?
39. Where in the room is there a picture?
40. Is there a kitten in the picture?
41. What color is it?
42. What is it doing?
43. Isn't the hat on the floor closer to the old man than to the young woman?
44. Where in the picture is there a little branch off of a tree?
45. Where in the picture is there a hanging lamp?
46. What are the children doing?
47. Why is the smaller child farthest from the bench?
48. Isn't the larger child wearing red hose?
49. What color is her hair ribbon?
50. Is the older child teaching her sister to walk?

Experiment B-2

SPONTANEOUS REPORT



Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT B-3
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

1. Name..... Age..... Sex.....
2. Class Father's Occupation.....
3. School Standing Favorite Study.....

Results

4. Spontaneous Report.

No. details reported..... No. correct..... No.
sworn to..... No. omitted..... No. correc-
tions..... No. wrong..... Range.....
Accuracy..... Certainty..... Correctness of
observation and report.....

5. Questions.

Total No. answered..... No. correct..... No.
sworn to..... No. omitted..... No. correc-
tions..... No. wrong..... Range.....
Accuracy..... Certainty..... Correctness of
observation and report.....

6. Reliability on Special Questions.

Total No. answered..... No. correct..... No.
sworn to..... No. omitted..... No. corrected
..... No. wrong..... Range.....
Accuracy..... Certainty.....

1. How many persons are there in the picture?
2. How many of the persons are women?
3. How many animals are there in the picture?
4. What is the monkey doing?
5. In what portion of the picture is the snake?
6. Does the man in the center wear a beard?
7. Does he wear a mustache?
8. Do any of the men in the picture wear ornaments?
9. Which ones?
10. What is the central figure doing with his left hand?
11. What is he doing with his right hand?
12. What is the woman at the left of the picture doing?
13. What color is her dress?
14. How many bracelets does she wear, and where?
15. Where is her left foot?
16. Where in the picture can you see growing grass or brush?
17. What kind of a roof has the hut?
18. Don't you think the infant is the grandchild of the woman holding it?
19. Where in the picture are the bamboo poles?
20. What cooking utensils are there in the picture?
21. What does the man at the extreme right have in his hand?
22. What is he doing?

Questions

Answer in regular order as many of the following questions as you can. If you come to a question you can not answer write "I don't know". Finish the list as soon as you can and record time spent in answering the questions.

Directions

Experiment B-3

Time.....

23. What time of day is it?
24. How do you know?
25. Don't you think the man holding the dove is a trader trying to sell his goods?
26. Where in the picture is there a ladder?
27. On which side of the picture is the bench?
28. Where in the picture is there a bundle of cut grass?
29. Isn't the front man on the lead elephant a white man?
30. How many men are there on the second elephant?
31. Do you think that all the men on the elephants are of equal station in life?
32. Why?
33. What have these people at the right of the picture been doing?
34. How do you know?
35. To what race do these people belong?
36. Is the scene laid in a desert country or in the jungle?
37. What is the rear man on the first elephant doing?
38. Is the elephant walking?
39. What color are the umbrellas?
40. What color is the fringe on the trappings of the elephants?
41. Is the man just to the left of the lead elephant leading him?
42. Is the baby pulling at its mother's shawl or holding to her hand?
43. Where in the picture is the jug?
44. Isn't the tree just in front of the corner of the hut?
45. What is peculiar about the front elephant's tusks?
46. How are the two men carrying the tiger?
47. Where on the tiger are the blood stains?
48. Isn't the loin cloth of the forward man of these two stained with blood?
49. Isn't he further forward than the fore feet of the elephant?
50. What is the infant doing?

Experiment B-3

SPONTANEOUS REPORT



(2) Instructions for All Sections and Groups in Test I—Experiment B

Pass out the blanks face up as in Experiment A and repeat the caution that under no circumstances must the folders be turned over, or opened up until directions are given to do so. After these preliminaries the experimenter says, "Write your name on the face of the blank where it says 'name', and provide all the other data called for. After 'school standing' state your year in college and after 'favorite study' write the name of your major subject." When this is completed the experimenter continues:

"In this experiment I am going to show you a picture which you are to examine very carefully for immediately afterwards you will be asked to write even to the minutest detail everything you saw in the picture. Now, holding on to your blank,⁷ gather around this part of the room closely, so that you may get a good view of the picture. (Waits until they are assembled and continues.) I will give you one minute to look at the picture, which gives you plenty of time to see everything about it, but you must work hard and not allow anything to distract your attention from the picture while it is exposed. Everybody ready! (Picture is exposed.)

"Be seated." When the class is seated the experimenter continues: "Now turn over the folder to the back page (shows them) and give a complete report of everything you saw in the picture. Begin at the top and write in a small hand so you will have plenty of room on the page. When you have finished this report (*but not before*) turn to the inside of the folder and, beginning at the top, answer in order as many of the questions as you can. If you come to a question you cannot answer write 'I don't know' in the proper place. Draw also a circle around the *number* of the questions that you would swear you have answered correctly. Finish the test as soon as you can and record the entire time spent in making the report and answering the questions in the proper space on the folder.

(3) Directions for All Training Sections in Tests II and III— Experiment B

For all sections of the *Training* group a systematic scheme of training in observation is followed, intensive for Group I, a scheme of milder training for the three sections of Group II. After the training described in the special memorandum No. 2 has been given, the following instructions for this test are read by the experimenter:

"The blanks for this test will be given you face up the same as in previous experiments and you are to give all the data called for on the first page: name, age, favorite subject, father's occupation, year in college, name of section and group, the same as in previous experiments. And remember that under no circumstances are you to turn over these blanks or look on the inside of the folder unless directed to do so." (Blanks are then given out. When the data called for have been properly recorded the experimenter continues.)

"The purpose of this experiment is the same as in the various tests of previous experiments. We wish to ascertain how well you can observe and report what you have seen and how much this ability can be cultivated or improved by special training and practice. You will recall that in the first test of this experiment you were shown a picture which you were asked to observe carefully in order that you could later describe in writing even to the minutest detail everything that you saw in the picture and answer correctly certain questions concerning the objects seen in the picture. You have now examined the corrected report which you made in this test and found that you made many mistakes. You failed to note important details about the picture which you were asked to observe. Some important details were entirely overlooked or not observed carefully enough to fix them in mind so they could be accurately reported. Other details of the picture were inaccurately observed or at least not correctly reported. Most of you reported things not represented in the picture at all. This record is quite normal because the ability to observe and to report *accurately* and *completely* all that we see is

⁷This test could best be given with the aid of a projection lantern but owing to lack of time for giving the tests after the method had been worked out and because it would be difficult to use a lantern projection in the different public school classes to be tested, the method of exposing the pictures here described was used in all our tests with this method. It is the aim to adapt the moving picture principle and device in this experiment when our tests are standardized.

the exception, and not the rule. The ability to observe can be greatly improved, if we will but take the trouble to interest ourselves in this sort of improvement. One of the chief purposes of the experiment is to see how much you can improve your present ability to observe and report accurately and completely what is placed before your eyes. Every individual in this group can and should make a decided improvement over his previous score.

"I am now going to show you another picture which you are to examine carefully, for immediately afterwards you will be asked to report in writing even to the minutest detail everything you saw in the picture. I will give you *one minute* to look at the picture, which is plenty of time to see everything about it, but you must work hard and not allow anything to distract your attention from the one purpose of seeing all the details while it is exposed. You can and should make a much better record than you made in Test I.

"In 20 seconds after you have made your observations on the picture you will be asked to give on the back of the folder a complete report of everything you saw in the picture and when you have finished this spontaneous report, *but not before*, to answer as many of the questions contained on the inside of the folder as you can. Beginning with the first question at the top of the page you are to answer in order as many of the questions as you can. If you come to a question you cannot answer write 'I don't know' in the proper space. Draw also a circle around the number designating each question you feel sure you have answered correctly, so sure that you would be willing to swear in court that you have answered it right. Finish the test as soon as you can and when you have finished, record at the top of the page the time you spent in making the complete report. You should finish the entire report, including your answers to the questions, in 20 minutes.

"Now holding on to your blanks, gather around this part of the room so you may get a clearer view of the picture." When all are assembled the ready signal is given and the picture is exposed for one minute. At the signal to stop the class is seated and in 20 seconds told to give a complete report of everything they saw in the picture, as directed.

(4) Direction for All Control Sections in Tests II and III-- Experiment B

For all sections of the control groups the directions given to the subjects will be the same for Tests II and III as in Test I. The following directions are read by the experimenter who says:

"As in previous experiments the blanks will be passed out face up and under no circumstances must you turn over the blanks or look on the inside unless you are directed to do so. This is one of the essential conditions of the experiment which must be strictly adhered to by everyone."

When the blanks have been distributed and all the data called for on the face of the blank obtained, the experimenter continues: "The aim of this experiment is the same as it was in Experiment A, namely, to determine how well you can observe and report on the things which you see. In this experiment I am going to show you another picture which you are to examine very carefully, for immediately afterwards you will be asked to report in writing everything you saw in the picture.

"You will be given one minute to look at the picture, which is plenty of time to see everything about it, but you must work hard and not allow anything to distract your attention from the picture while it is exposed.

"In 20 seconds after you have made your observations you will be asked to state in writing on the back page of your folder everything that you saw in the picture and when you have finished this spontaneous report, *but not before*, you are to answer as many of the questions contained on the inside of the folder as you can. Beginning at the first question at the top of the page, answer as many as you can. If you come to a question you cannot answer write 'I don't know' in the proper space. You are also to draw a circle around the number designating each question which you feel sure you have answered correctly, i.e. so sure that you would be willing to swear in court you answered it right. Finish the test as soon as you can and when you have finished record in the proper space at the top of the page the time you spent in making your complete report. This time you will see on the board, as in previous experiments. You should finish your entire report, including your answers to the questions, in 20 minutes

or less. Work hard and try to make the best possible record in the experiment that you can.

"Now holding on to your blanks assemble in this part of the room so you can get a clearer view of the picture." When all are ready give the signal and expose the picture one minute. At the signal to stop, the class is seated and in 20 seconds told to give a complete report of everything they saw in the picture, as directed. They must be told to begin at the top of the page and to write in small hand so they will have plenty of room. Those who lack room on the page will be handed a small sheet of paper which will be attached to the inside of the folder when the report is collected.

EXPERIMENT C. NOTING AND REPORTING EXACT DIFFERENCES

(1) Various Test Forms and Pictures Used for Observation in Experiment C

In Experiment C the following three test forms were prepared and after preliminary experimenting used in our investigations.

Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT C-1
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

Name..... Age..... Sex.....

Class..... Father's Occupation.....

School Standing..... Favorite Study.....

Range..... Accuracy..... Certainty.....

Correctness of Observation and Report.....

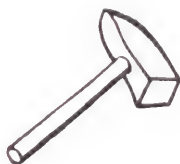
Experiment C-1

Directions

State on the opposite page whether each picture is alike or different from one of the pictures seen on the back of this folder; and if different tell exactly in what ways it differs from the original.

RECOGNITION

Time.....

**1****2****3****4****5****6****7****8****9****10****11****12**

Total details reported..... No. Correct..... Sworn.....
Omitted..... Corrections..... Wrong.....

Experiment C-1

REPORT

1

2

3

4

5

6

7

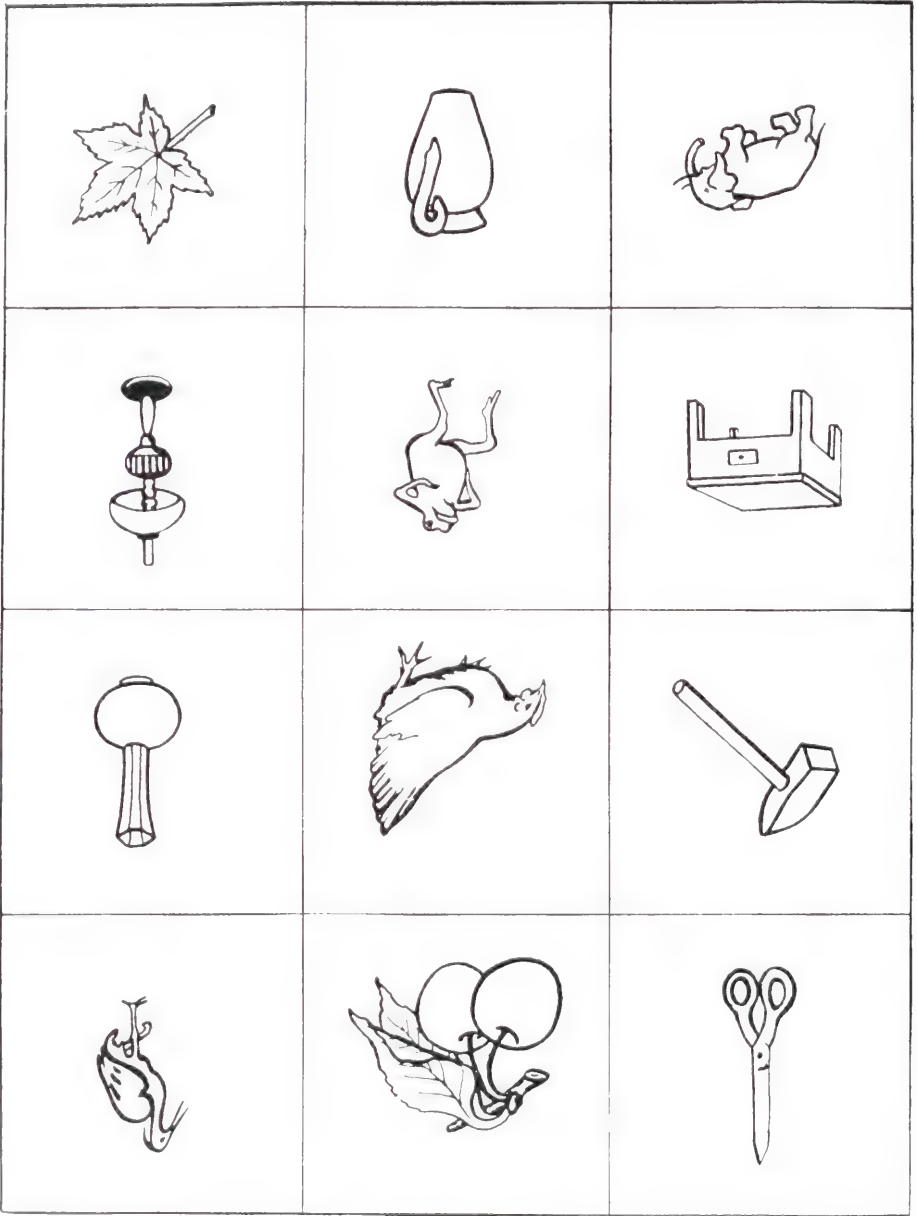
8

9

10

11

12



Experiment C-1
OBSERVATION

Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT C-2
Section.....

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

Name..... Age..... Sex.....

Class..... Father's Occupation.....

School Standing..... Favorite Study.....

Range..... Accuracy..... Certainty.....

Correctness of Observation and Report.....

Experiment C-2

Directions

State on the opposite page whether each picture is alike or different from one of the pictures seen on the back of this folder; and if different tell exactly in what ways it differs from the original.

RECOGNITION

Time.....

**1****2****3****4****6****7****8****9****10****11****12**

Total details reported..... No. Correct..... Sworn.....
Omitted..... Corrections..... Wrong.....

Experiment C-2

REPORT

1

2

3

4

5

6

7

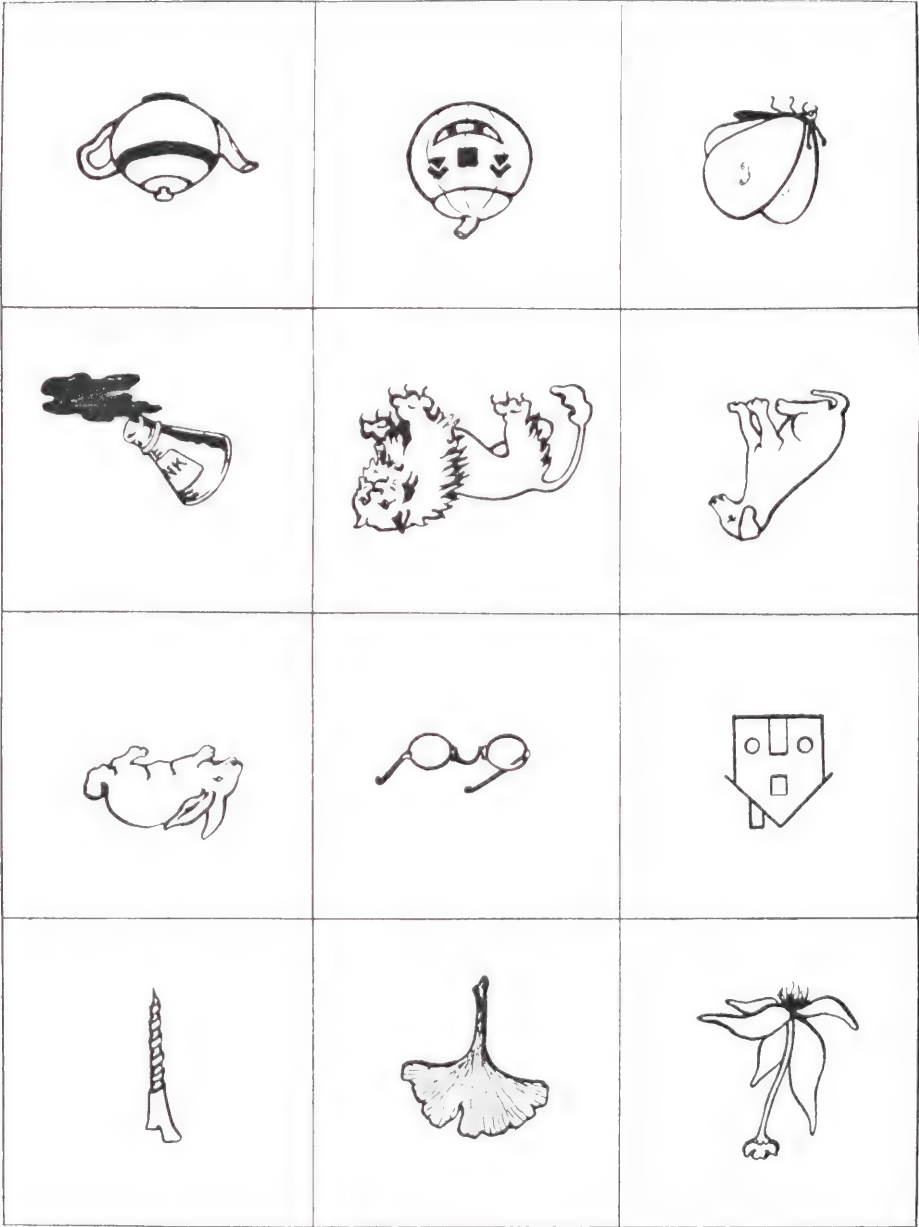
8

9

10

11

12



Experiment C-2
OBSERVATION

Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT C-3
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

Name..... Age..... Sex.....

Class..... Father's Occupation.....

School Standing..... Favorite Study.....

Range..... Accuracy..... Certainty.....

Correctness of Observation and Report.....

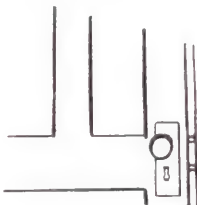
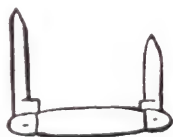
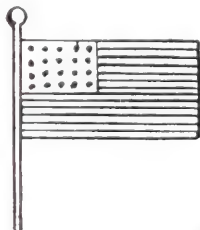
Experiment C-3

Directions

State on the opposite page whether each picture is alike or different from one of the pictures seen on the back of this folder; and if different tell exactly in what ways it differs from the original.

RECOGNITION

Time.....

**1****2****3****4****5****6****7****8****9****10****11****12**

Total details reported..... No. Correct..... Sworn.....
Omitted..... Corrections..... Wrong.....

Experiment C-3

REPORT

1

2

3

4

5

6

7

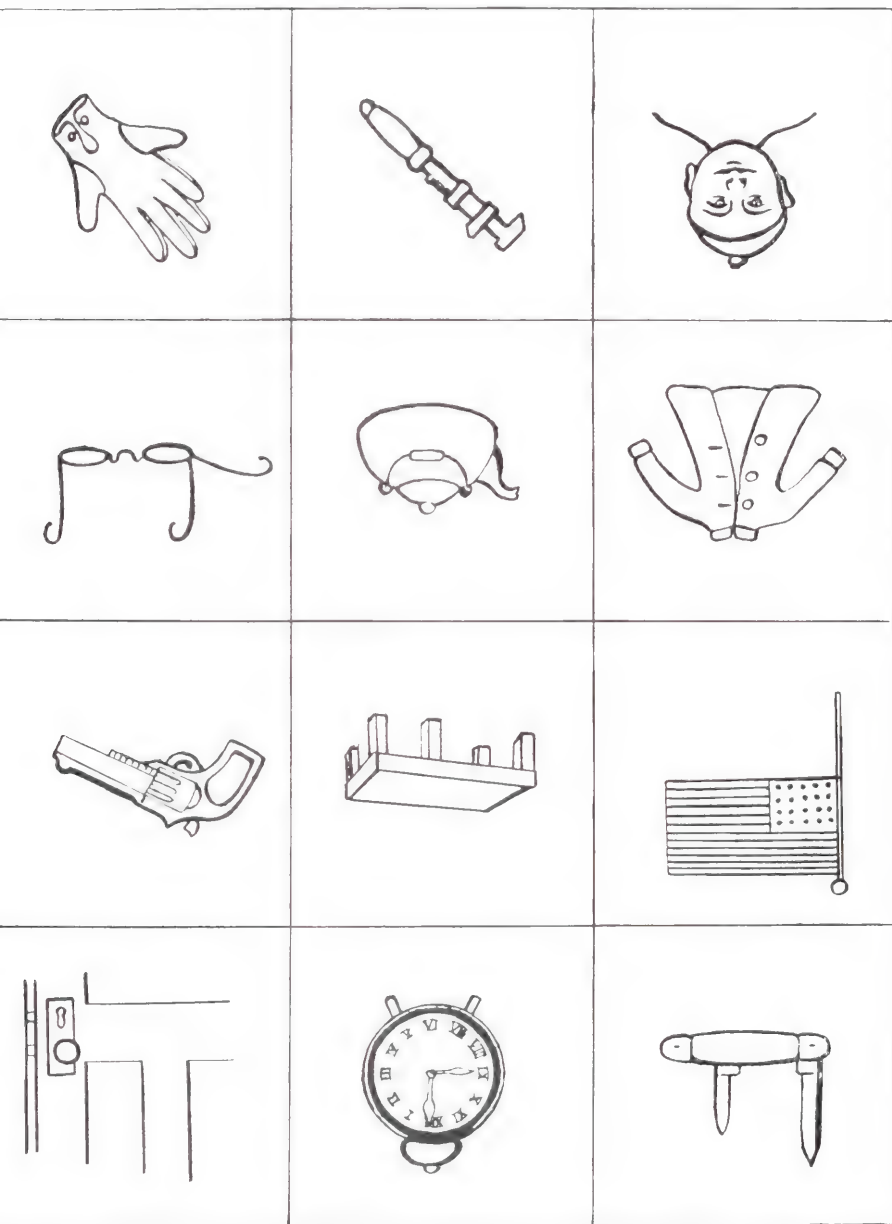
8

9

10

11

12



Experiment C-3
OBSERVATION

(2) Directions for All Sections and Groups in Test I—Experiment C

"The purpose of this experiment is the same as in Experiments A and B, namely, to determine how well you can observe and report on the things which you see. I am going to show you a number of pictures placed in small black squares as in the first experiment. These you are to examine very carefully for 30 seconds in order to impress upon your mind every detail of the pictures, for immediately afterwards you will be shown a second set of pictures and asked to tell in what particular way or ways each picture in this second list differs from the pictures contained in the first group.

"Now take hold of the lower right hand corner of your folder and when I say 'Go' turn it over thus . . . (illustrates method) and observe the picture as directed. Get ready. Go!" After 30 seconds the experimenter says "Stop, turn over the folder face up as it was placed on your desk before the experiment began."

In 20 seconds more the experimenter continues, "Now open your folder to the pictures on the inside." After the folders have been opened he says: "You will note that the pictures in this list are numbered. State on the blank page, and opposite the corresponding number for each of these pictures, whether it is alike or different from one of the pictures seen on the back of the folder; if different, tell in what specific ways it differs from the original. If you do not know, write, 'I don't know' in the proper space. Remember, no questions are to be asked during the experiment and under no circumstances are you allowed to refer back to the stimulus group. When you have finished draw a circle around the figure designating the answers you feel certain are correct, i.e. those you would swear are correct; and record at the top of the page the time required to note the similarities or differences in these pictures, handing your paper to the assistant as soon as you have finished.

(3) Directions for All Training Sections in Tests II and III— Experiment C

Before this test is given to the training groups the corrected test sheets used in the first test of the experiment are returned to the members of the class for examination and study, same as in Experiments A and B. Each subject notes the number of details correctly observed and reported, his number of errors, and the omissions made in the first test. He is then given time to study the record made in the first test. In case all errors are not discovered they are pointed out by the experimenter *after* the subjects have had a chance to correct their own record by comparing it with the original stimulus list of pictures. The subjects were urged to look at the original stimulus pictures before they examined their own record.

When this and the other special standard instructions prepared for the training groups have been given, the papers for the first test are collected and the blanks for the second test distributed. But before this is done the experimenter repeats the caution that these papers must be kept face up until the signal is given to turn them over. When the blanks have been distributed and the data called for on the first page has been obtained the experimenter says:

"Now everyone attention! You will recall that in the first test of this experiment you were shown a group of pictures which you were asked to examine very carefully for immediately afterward you were required to tell in what specific way each picture in the second list was different from the corresponding picture in the first group. You have just examined the result of your observation and report in the first test. As in previous tests you made many mistakes. You failed to notice important features about the pictures which you observed, and reported things about them that were not significant or that did not exist at all. It has also been shown by the results of your previous tests that you can greatly improve your ability to observe and report upon situations similar to the one presented in this experiment.

"Now today I am going to show you another set of pictures similar to those shown you in Test I of this experiment. Observe them carefully in order to note and impress upon your mind every detail about each picture in the list because immediately afterward I shall ask you to state in what specific ways each picture in the second list differs from the corresponding picture shown you in the first group. You will be allowed 30 seconds to look at the pictures; that is not very long, so you must pay close attention and work hard to see everything about the pictures in the time allowed. You can and should make a much better record in this second test than you did in the first test

because you have made considerable progress in learning to observe this type of material in the previous experiments.

"Now take hold of the lower right hand corner of your folder and when I say 'go', but not before, turn it over and observe the pictures on the back of the folder as directed. Get ready. Go!"

In 30 seconds say: "Stop, turn your folders face up as at the beginning of the test." Wait 20 seconds and continue: "Now open your folder to the list of pictures on the inside. You will note that these pictures are numbered. When I tell you to start, state on the blank page to the right and opposite the number corresponding to each picture in what specific ways each picture in this list differs from one of the pictures seen in the previous group. If you do not know write 'I don't know' in the proper space. Draw also a circle around the figure designating each answer you feel sure is correct (i.e. those you would be willing to swear in court were correct) and record the time consumed in making your report. Get ready. Begin!"

(4) Directions for All Control Sections in Tests II and III— Experiment C

"The purpose of this experiment is the same as in Experiment A and B, namely, to determine how well you can observe and report on the things which you see. In the experiment today I am going to show you a number of pictures placed in small black squares as in the first experiment. These you are to examine very carefully in order to note and impress upon your mind every detail about the pictures, for immediately afterwards you will be shown a second set of pictures and asked to tell in what particular way or ways they differ from the pictures seen in the first set. You will be allowed 30 seconds to look at these pictures; 30 seconds is not very long, so you must pay close attention and work hard to see everything about the pictures in the time allowed you. No questions must be asked during the course of the experiment and remember that under no circumstances are you allowed to turn over the folder or to look on the inside until you are directed to do so. This is one of the conditions of the experiment which must be strictly adhered to.

"Now everybody take hold of the lower right hand corner of your folder and when I say 'go', but not before, turn it over and observe the pictures carefully as directed. Get ready. Go!"

In 30 seconds say "Stop, turn over your blank face up as it was before." Wait 20 seconds, then say:

"Now open your folder to the pictures on the inside." When the folders are opened, continue: "You will note that the pictures in the list before you are numbered. State on the blank page to the right and opposite the corresponding number for each picture in what specific way or ways each picture differs from one of the pictures seen in the previous list. If you do not know write 'I don't know' in the proper place. Draw also a circle around the figure designating each answer you feel certain is correct, i.e. those you would swear in court you had answered correctly, and record the time consumed in making this report, as in previous experiments. Begin."

(All sections of the control groups in each experiment are kept ignorant of their score, are given no help in observational learning, and under no circumstances must they be allowed to look at the original sheets after they have taken the tests. To prevent this the papers in these sections were collected as soon as finished.)

EXPERIMENT D. RECOGNITION OF GEOMETRIC FORMS

In Experiment D only one of the three forms was used in the investigation here reported, D-1. This is reproduced below and the directions for giving the test were similar to those for Experiment A.

Department of Psychology
Indiana University
December, 1921

Studies in Observational Learning
EXPERIMENT D-1
Section

Test of
RANGE AND ACCURACY
in
OBSERVATION AND REPORT

Name..... Age..... Sex.....

Class..... Father's Occupation.....

School Standing..... Favorite Study.....

Range..... Accuracy..... Certainty.....

Correctness of Observation and Report.....

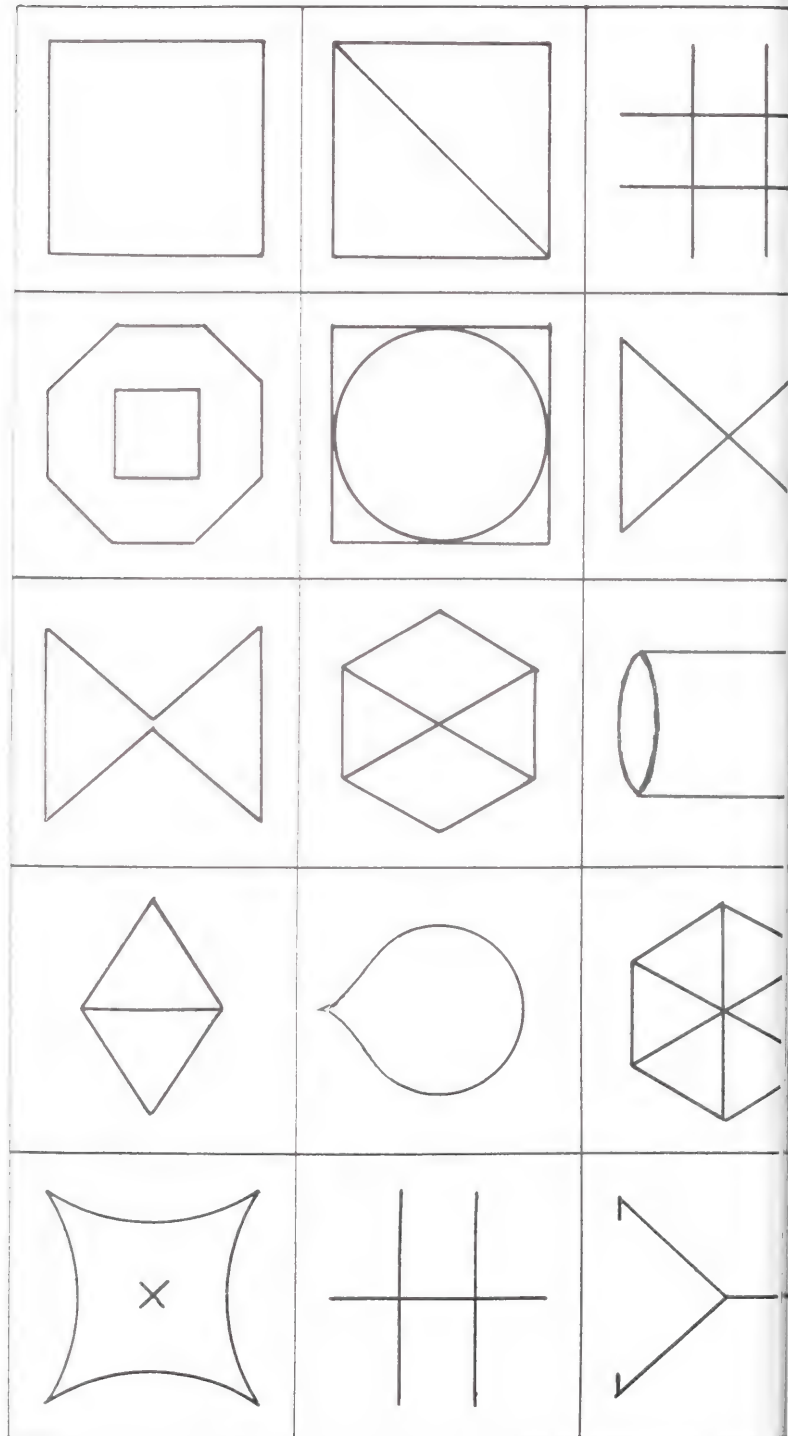
EXPERIMENT D-1

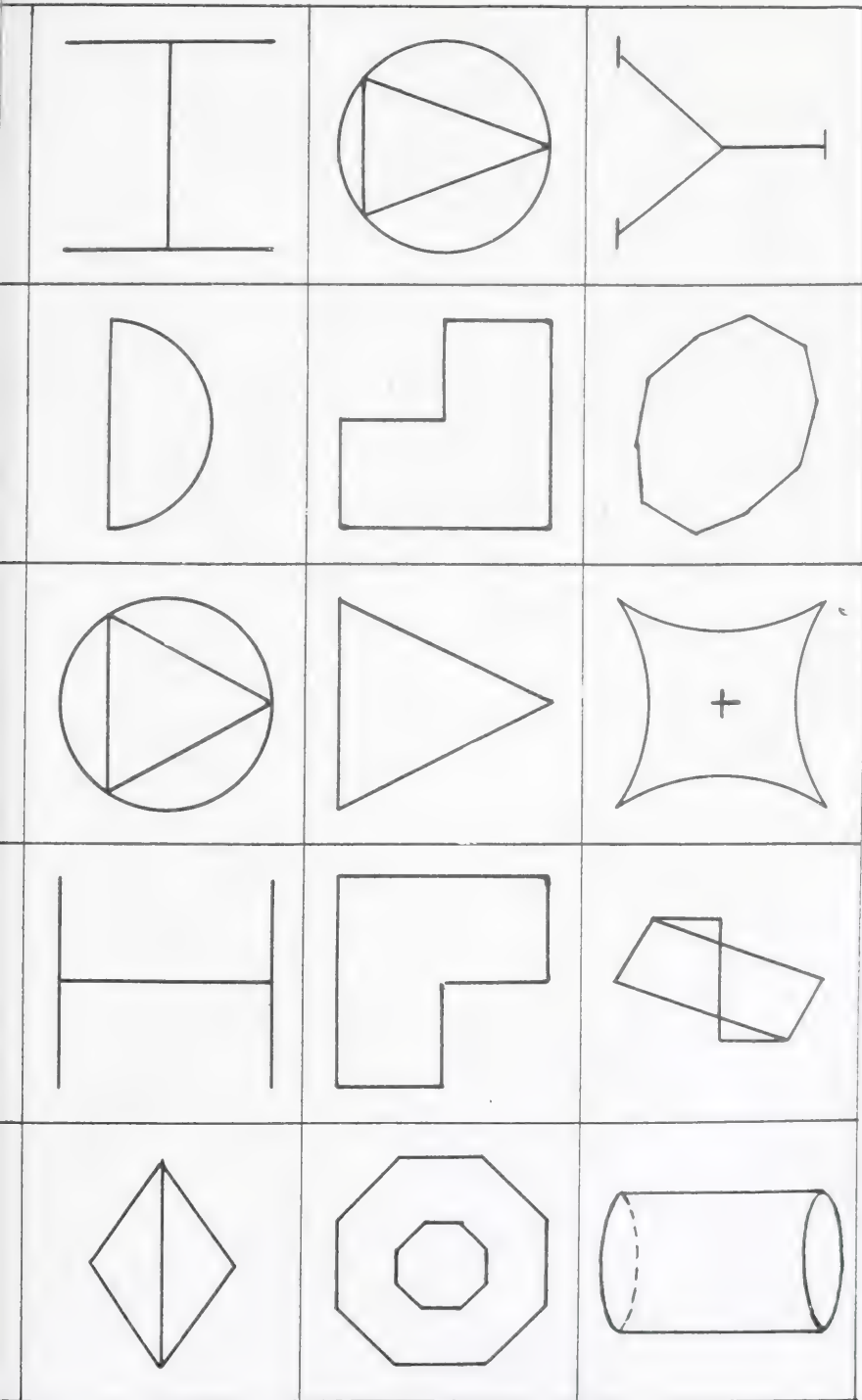
Directions

Mark each form with a cross (X) that is exactly like one seen on the back of this folder.

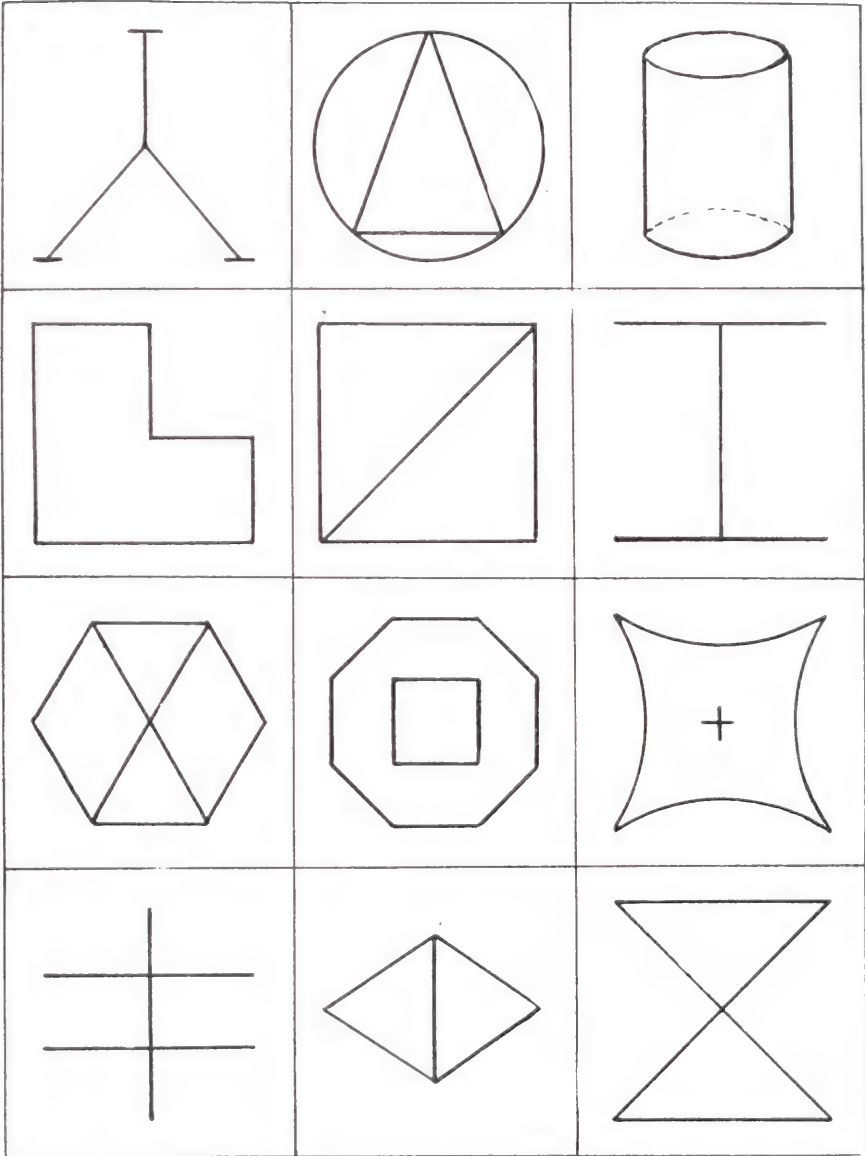
Time

RECOGNITION





TOTAL NUMBER DETAILS REPORTED..... No. Correct..... No. Omitted.....
 No. Corrections..... No. Wrong.....



Experiment D-1
OBSERVATION

Educability of Observation and Report

ALICE STOUTE BEARD

Graduate Student in Psychology, Indiana University

1. Problem

FOUR previous investigations have been made to determine whether the ability to observe and report accurately upon the things found in the world about us can be improved by practice and training. In 1904 Miss Marie Borst¹ had twenty-four adult subjects observe a colored picture for one minute and after three and nine days they were required to give in a spontaneous report everything they saw in the picture and immediately afterwards to answer certain questions about the picture observed. Each subject was given an opportunity to observe five different pictures of something near the same degree of difficulty, which provided an opportunity for some practice in this type of reaction. One of the conclusions of her investigation was that the mental functions involved in observation and report could be cultivated and trained by practice.

A little later Rosa Oppenheim² arranged an investigation to determine to what extent observation and report could be improved by practice and training. Her particular problem was to determine whether the per cent of reliability for observation and report found in the various investigations of Stern (76 per cent), Werschner (74 per cent), and others was a fixed quantity or whether it could be improved by practice and training. She made three experiments in three months upon a group of thirty girls ten to twelve years of age, using the picture method of Stern. After each test the spontaneous reports made by the subjects and the answers to questions asked about the picture were recorded. Then the picture was shown again and the observers asked to discover the errors they had made. The subject was then admonished to observe more accurately in the future and to make her report as accurate and complete as possible. The results of this investigation showed a rather marked and constant improvement for all subjects, who improved not only the correctness of their observations and reports but also increased the number of things that could be correctly apprehended and reported in a given time. The spontaneous reports became progressively more accurate while the answers to questions became perfect and the subject's tendency to resist all suggestive questions increased steadily. Miss Oppenheim concluded as a result of her investigation that both the amount that could be apprehended and its correctness could be improved by practice and training.

¹ Marie Borst, "Recherches Experimentelles sur l'educabilite et la fidelite du temoinage", *Archiv für Psychologie*, Vol. 3, 1904, pp. 233-314.

² Rosa Oppenheim, "Über die Erziehbarkeit der Aussage bei Schulkindern", *Beitrag zur Psychologie der Aussage*, Vol. II, pp. 338-381.

H. Breukink¹ repeated Miss Oppenheim's experiments on 108 adult subjects, using the same pictures and questions used by Miss Oppenheim. He exposed the pictures by means of a projection lantern. His method of training was to permit the subjects to repeat the observations after the report had been made and thus to point out to them the errors they made in their observations and reports. This practice improved both the reliability and range of their spontaneous and deposition reports verifying Miss Oppenheim's findings for adults.

Baade and Lipmann's² extensive study, where experimental demonstrations in physics were used as materials to be observed instead of pictures, showed no real practice effects but, as E. Meumann³ pointed out, by the conditions of their experiments they precluded all chances for training the complicated mental functions involved.

The first direct attempt that was made to give special training to individuals for the act of observing was made by E. Meumann and Miss Borst in 1906. The latter took sixteen pupils from the schools, six and seven years of age, whom she tried to instruct by means of three different methods, measuring the results of the training in each case by means of the picture test used by W. Stern and others in their Aussage experiments. She first employed (1) a method of general guidance where she tried to teach the children to make systematic observations from particular points of view, using certain categories of observation that were known to be efficient for complete and perfect observation and report. (2) In her second method she tried to raise the apperceptive mass of her subjects by making the children more familiar with the various forms of sensory material to be observed. To this end formal instruction was given her subjects concerning colors, forms, actions, relations of magnitude, also in naming the various objects and attributes which were to be observed. (3) Her third method consisted in trying to influence the will of her subjects. She tried to arouse their interest in their own improvement as such, and to create a definite desire to make always a better score.⁴ The first method of training gave a negative result and the second showed little or no gain as a result of the training and practice, but the third method of instruction showed a decided improvement as the practice proceeded.

The purpose of the present paper is to make a preliminary report on some of the results which we obtained in our attempt to train the observational powers of the 440 individuals who served as subjects in our training groups, by means of a systematic scheme of training which we evaluated and checked up by means of the records made on the same tests by an equal number of control sections. The particular problem presented by this part of our investigation was to answer the question,

¹ H. Breukink, "Über die Erziehbarkeit der Aussage", *Zeitschrift für Angewandte Psychologie*, Vol. 3, 1909, pp. 32-87.

² W. Baade, "Aussage über physikalische Demonstrationen mit besonderer Berücksichtigung der Frage der Erziehbarkeit der Aussage", *Zeitschrift für Angewandte Psychologie*, Vol. 4, 1911, pp. 189-311.

³ E. Meumann, *Vorlesungen über die Experimentelle Pädagogik*, Vol. I, pp. 324-337.

⁴ Compare study "The Will to Learn", an experimental study of learning incentives by William F. Boel and Lee Norvell, *Journal of Educational Psychology*, October, 1922.

"Can this ability to note and report accurately upon the things found in the external world about us be improved by education and special training, and if so, how and how much?"

2. Method

To determine whether the group of mental functions involved in one's ability to observe and report can really be improved by education and special training, it is necessary:

- (1) To obtain the initial ability to observe and report facts accurately, of the various groups of subjects which we attempted to train.
- (2) To devise a method of measuring observational and report ability which is accurate and also susceptible of use on large numbers of subjects.
- (3) To apply a definite scheme of training to certain training groups, to measure the results and compare the improvement made by these training groups with the gains made by an equal number of control groups which were given the practice but not the training.

a. How Improvement was Measured. A necessary condition for the solution of this problem was to arrange the individuals who were to take the tests into groups and sections. The University students were divided into three main groups, I, II, and III, each group being made up of three sections, a, b, and c, with forty individuals in each section, 360 subjects. Group I, which was made up of juniors, seniors, and a few postgraduate students, was made an intensive training group and given all the training we were able to give them in the fifty-minute periods devoted to each test. Group II, made up almost entirely of sophomores, and consisting of 120 individuals, received less training; while Group III, which was composed of sophomores, juniors, and seniors and also made up of 120 individuals, was used as a control group, receiving no special training in observation except that which would naturally be picked up from test to test as the practice proceeded.

The intelligence rating of all the students used was determined in advance, and it was arranged that the mild training and control groups had the highest mental rating.

In the senior high school 270 individuals were tested, arranged into Groups I, II, III, and IV. Groups I, II, and III were divided into three sections each, so that an equal number of individuals in each group could be required to observe each picture and set of pictures first, second, and third, as was explained by Dr. Book. Group IV was tested as a whole. Group I was used as a training group and was made up entirely of freshmen, 75 in number, while Group II was a control group of 75 freshmen. Group III was a control group made up of 75 seniors, and Group IV was a special class in vocational information, made up of 45 juniors, students who were handled as a single section and given the special training in observation.

In the junior high school the entire sixth grade (200 cases) was tested and divided into five groups, with approximately 40 individuals in each. Groups I and III were used as training groups, while II, IV, and

V were made control sections, except in Experiment C, where Group V was given special training in observation before and after each test.

It was by this method of grouping our subjects that we were able to measure the improvement made in the exercise of the functions involved. To determine whether a gain could be obtained as a result of any scheme of special training we might devise and apply, one would have to have at least two groups of students to compare, one a training group, the other a control group, each subjected to the same set of conditions, *except* that the individuals of the training group would be instructed by some standardized method of training designed to improve their ability to observe and report more accurately upon what was observed, while the control groups would be given the same practice and required to observe the same material, but without the special instruction arranged for the training group.

b. *Types of Observation Studied.* As already pointed out by Dr. Book, four different kinds of experiments were used, designated as A, B, C, and D. Experiment A set for the learners the task of noting the details of various groups of pictures of familiar objects in such a way that these same pictures could be recognized and marked when placed among an equal number of similar and entirely different pictures in a second group. For example, on the stimulus sheet there were twelve sets of pictures, whereas the recognition sheet had the same twelve, with twelve others that were similar, and six sets of pictures that were entirely different. In this experiment the subjects were asked to mark with a cross each group of pictures that was exactly like the group seen on the stimulus sheet. They were also asked to draw a circle around the crosses marking the sets of pictures that they felt sure they had marked correctly—so sure that they would be willing to swear to their correctness. Lastly, they were to record the time necessary to complete the test, which was placed on the board in half-minutes by the instructor. Specific directions were given each section and a uniform set of instructions was used to instruct the training sections.

In Experiment B the students were given one minute to observe a picture which was to be observed carefully and accurately enough to enable them to give, first, a spontaneous report of everything in the picture even to the minutest detail, and, secondly, to answer fifty questions about the picture, arranged on a specially prepared folder placed in their hands. These questions required the use of the following five types of categories of observation:

1. Noting and reporting on the objects and attributes of objects found in the picture.
2. On the actions and events.
3. On color and number.
4. On the time and space relationships found in the picture.
5. On the causal relationships and certain interpretative features of the pictures.

There were also ten suggestive questions in each fifty, making eight regular and two suggestive questions for each category. After having answered the questions the students were asked to draw a circle around

the number of each question that they felt certain they had answered correctly.

Experiment C involved noting the details of twelve small pictures carefully and accurately enough to enable the observer to point out the differences between these and twelve similar pictures shown to the subjects immediately afterwards.

In order that a brief scheme of training in observation might be arranged, three test forms or sets of materials were prepared for each experiment and as many practices given to all the training and control groups with each set of materials.

In constructing the materials for these various test forms the pictures and forms used were made as nearly as possible of the same degree of difficulty. But to do away with the effect of any inequality in the difficulty of this material which might exist, forms were given in a different order to the three sections of the various groups so that an equal number of students would observe a different set of material in the first, second, and third practice as has already been explained by Dr. Book.

Experiment D was a test similar in method to Experiment A, except that instead of observing *pictures* of familiar objects, geometric forms were used. Only one form of Experiment D was given in the investigation I am to report. This was given as a final or check test to get some indication of the general value of the training in observation given.

c. *Method of Training used to Improve the Observational Ability of the Various Training Groups.* The more important elements emphasized in the uniform scheme of training the various sections of our training groups which we employed are the following:

(1) The importance of observation for all learning and for successful adaptation in life was illustrated and emphasized by the experimenter as fully as possible. This was done to try to get the subjects in our training groups interested in improving their powers of observation as such.

(2) It was further emphasized that this ability *could be improved* by practice and training, just as one learns to read or to play baseball.

(3) It was demonstrated to each member of the training groups by our measurements of their actual ability to observe and report the materials presented for observation in these experiments, how inaccurate and inefficient they really were in this type of reaction. In this and other ways the need for improvement was emphasized.

(4) All subjects were frequently urged to do their best and reminded at the beginning of each practice that they *could* really improve their ability in this line if they made up their minds to do so.

(5) The corrected papers were returned after each practice just before the next test was taken so that each member of the training groups had an opportunity to take note of and study all omissions and mistakes which he had made in his previous report. After they were given a chance to notice all their mistakes the correct observations were pointed out. It was found that many subjects could not see the important details even after they looked at the pictures a second time.

(6) The subjects were frequently urged to be on the alert for more

economical methods of surveying the various pictures and forms and for devices that would impress these features on their minds until they could be accurately reported.

(7) They were asked to keep particularly in mind the *goal idea* or purpose of the observation given them in the directions.

(8) They were also directed to spend the short interval between the exposure of the set of pictures to be observed and observing the second or stimulus group in mentally reviewing the pictures on the stimulus sheet so that these sensory impressions would not be immediately knocked out of mind by other stimuli. They were also cautioned not to do anything that would knock out of mind the positive after-image or memory images of the pictures observed.

(9) Lastly, they were cautioned not to think of any of these instructions while observing the pictures or while trying to identify them on the recognition card.

(10) For the *intensive training sections*, Group I of the college students, the whole psychological process of observation and report was carefully analyzed and studied in addition to the above.

It was believed that one of the most important items in our training would be to return the papers and let the subjects see their own mistakes and to let them see their scores. Most of the students did not know they were so poor in observation and report; they had never before been able to check up on their ability in this regard. So when their papers were returned they were able to see just where they stood, the kinds of mistakes they were making, and to calculate their rate of improvement from test to test.

In the directions for each test, the students were told what to do, but the training groups were urged in addition to consider all the points just mentioned, and assured that they *could* improve their ability in this regard if only they would make up their minds to do so.

d. *Methods of Determining the Effects of Training.* Results were tabulated for the following points: the total number of items reported, the number correct, number wrong, number omitted, total number sworn to, and the number sworn to and answered correctly.

The total score for all three sections of each training and control group was figured separately so that the training effects could be accurately determined by comparing the total record made by the several training and control groups. But four other methods were used to determine and study the effects of the practice and training. The results of these later comparisons can, however, not be presented in this report.

(1) We compared the score made by the same sections in the several training and control groups, i.e. the record they made in the first, second, and third tests. They observed different materials in these successive tests which were of about the same degree of difficulty so that the effect of the practice might be expected to show up for each particular section as the practice proceeded, notwithstanding the fact that different pictures were observed.

(2) We also compared the record made by the different groups of individuals in our several training and control groups who observed the

same pictures in the first, second, or third practice. Here we compared the results obtained by different groups of individuals whose powers of observation might be expected to be about equal, when the same pictures or materials were used for observation, i.e. the same material was observed in successive practices, but by different groups of individuals.

(3) A third method of studying the effect of the training was to compare the record made by a section in Group I, who observed a certain picture or set of pictures with the record made by a different section (same number of individuals) in Group III, who observed this material in their third or last practice. By following the same procedure for each section and for each of the test forms or pictures to be observed in each experiment it was determined whether there was a practice effect for each picture in each of the four experiments or types of observation as we pass from the first to last practice.

(4) A still better method of handling our data to determine the effects of the practice and training for each set of pictures in the several experiments was to determine the average initial ability to observe and report on each set of pictures or kind of material used in successive practices, comparing the record made by all college subjects who observed a given material first with the average record for all college subjects who observed the same material in their second practice and both of these records with the average score obtained by all subjects who observed it last, treating the various high school sections in the same way. In this manner the actual practice effect for each type of material used in the several experiments was accurately determined.

To, determine whether our various training groups had increased their ability to observe and report accurately upon material that was entirely different from that used in our regular practices and whether they had increased their ability to observe such materials more than had the members of our various control groups we gave to each of our training and control sections, after all three forms of Experiments A, B, and C, had been given, a final or tenth test using the geometric forms contained in Form D-1. The score made on the first test taken, which was in every case some form of Experiment A, was then compared with the score made on this final tenth test, and the amount of improvement made by each training and control group determined and compared. In this manner a final check on our training was obtained.

3. Results

a. General Summary of Results

Only a brief summary of some of the more important results on "Educability" can be given in this report. The complete findings will be published later in a special report. The more important results may be briefly summarized as follows:

(1) All training sections and groups in each experiment made more improvement in ability to observe the various types of material presented and in all types of observation studied than did the corresponding control groups. This is true without exception for the three college groups, for

the four high school groups, and for the five classes tested in the sixth grade.

(2) Marked improvement was made in the following elements of gain:

a) As the practice progressed, more and more of the possible things given to be observed were noted and accurately reported.

b) Fewer correct details were omitted as the practice progressed.

c) To begin with, about one-half or more of the items reported and believed to be correct were wrong. With the practice and training, fewer and fewer details reported as correct were wrongly reported.

d) The range or number of details accurately observed increased more rapidly for the various training groups than it did for the control groups, as did also the accuracy of the reports actually made.

e) One of the most important factors in observation and accuracy of report is the subjective feeling of certainty which accompanies the observation and report. With the special training and practice given to the various training groups, this feeling of assurance increased in amount and at the same time became more reliable or accurate. That is to say, the members of our various training groups improved their ability to judge the correctness of their observations and reports very much more rapidly than did the members of the control groups, making the *warranted assurance* and *assured accuracy* greater for the various training groups.

The results obtained by the various training and control groups in Experiment A as shown in Tables I, II, and III, are typical of the results for all experiments and groups. These have been placed in your hands for ready reference and study. Taking as an example the results of Experiment A for the various university groups, I, II, and III, it will be seen that the *number of right* details reported from Test 1 to Test 3 increased for Group I, the intensive training group, 17 per cent. In Group III, the control group, the increase in the number of correct details reported is only 4 per cent.

The *number of wrong* details reported by Group I, from Test 1 to Test 3, decreases 18 per cent; for Group II, 13 per cent; and for Group III, only 11 per cent.

The *accuracy* of the reports made from Test 1 to Test 3 increased 18 per cent for Group I. For Group II it increased 14 per cent; for Group III, only 10 per cent.

These are a few examples of the gains actually made in the various factors which make up the total gain or improvement. All our results show that a greater gain in improvement was made by the intensive training group than by the mild training group. The *great* gains made by the intensive training group over the control group is very marked in all the co-efficients of gain.

The results in this same experiment for the high school show similar variations in gain for the various training and control groups. (Compare Table II.) For example, in Group I, a training group, the improvement in the *number of right* details reported was 12 per cent from the first to the third test; for Group IV, also a training group, it was 20

per cent, while Group II, the freshman control group, increased only 8 per cent. The record made by the senior control group, Group III, showed an actual *decrease* of 3 per cent in the number of correct items reported as we pass from the first to the third practice.

In the junior high school, similar results were obtained. Groups I and III, both training groups, increased the *number of right* details reported 13 per cent in three practices, while Groups II, IV, and V, all control groups, decreased in one case 10 per cent, but in the other two cases they *decreased* 7 and 8 per cent respectively.

Similar improvement tables to those placed in your hands have been worked out for Experiment B, both for the regular questions and for the special questions, also for Experiment C. The gains in improvement for Experiment B are a little more marked even than those for Experiment A, while the results for Experiment C are still more striking, showing that the special scheme of training used in our experiments was effective in producing improvement for all the sections we tested in the University, in the high school, and in the grades, and for all types of observation studied.

Summarizing in a word the improvement made by the training groups of college, high school, and sixth grade students over that made by the corresponding control groups tested, we may say that on each of the items or elements of improvement the training groups made more gain than did the control groups:

- (1) They reported a greater percentage of the possible details correctly.
- (2) They noted and reported on more details and omitted fewer details that should have been observed than did the control groups.
- (3) They reported fewer details that were wrong, increasing the accuracy of their reports more rapidly from test to test.
- (4) The training groups also felt certain about more of their observations and reports than did the control groups.
- (5) Moreover, this subjective feeling of certainty became more and more accurate as a result of the training and special practice given under the conditions of this experiment.
- (6) The training groups in the college, high school, and sixth grade made a better record on the tenth, or D-1 test, which required the observation of an entirely different sort of material than did the control groups.

These and other important results are contained in the improvement tables placed in your hands. (See Tables I to VIII below.) Because of the more complex nature of the types of observation demanded in experiments B and C the improvement for these types of observation is even greater still than for Experiment A, but this result was not obtained in time to place the improvement tables for these experiments in your hands.

It should also be pointed out that the effect of training appears equally striking when the improvement is figured by the other four methods of handling the data mentioned in section *d* above. Our conclusion is that the power to observe and report accurately upon the things

found in the world about us can be improved by special training and practice if we have a practical method of measuring the improvement in this type of learning. The learners will somehow find a way to make the necessary adaptations if given suitable direction, and if interested in their own rate of improvement for this type of response.

The improvement tables referred to above and showing the amount of gain in the various co-efficients of improvement are reproduced below for purposes of comparison and study.

TABLES SHOWING AMOUNT OF IMPROVEMENT MADE IN THE VARIOUS FACTORS OF GAIN

TABLE I

Showing Per Cent of Improvement of Different College Training and Control Groups in Various Elements of Gain in Experiment A

TESTS	Group I Intensive Training (120 cases)			Group II Training (120 cases)			Group III Control (120 cases)		
	1	2	3	1	2	3	1	2	3
1. Number right	69	78	86	69	77	85	70	72	74
2. Number omitted	34	24	17	34	25	17	33	31	28
3. Wrong	30	14	12	24	13	11	26	16	15
4. Range.....	99	93	98	93	90	97	97	88	90
5. Accuracy	70	85	88	74	86	88	73	82	83
6. Inaccuracy	30	15	12	26	14	12	27	18	17
7. Assurance	51	66	73	47	73	82	65	67	71
8. Reliability of oath	78	93	94	83	90	93	78	87	89
9. Warranted assurance..	40	61	68	39	66	76	51	58	63
10. Unwarranted assurance	11	5	4	8	7	6	9	8	8
11. Assured accuracy.....	58	73	78	53	76	86	70	71	76

SUMMARY

1. In each of the elements of improvement the training groups show greater gains than does the control group.
2. The intensive training group shows more gain in each of these factors than Group II which did not receive quite so much special training.
 - (a) They observe and report correctly a greater per cent of the possible details.
 - (b) They report fewer details that are wrong.
 - (c) The range of their observation and report is greater.
 - (d) Their reports are more accurate than those of the control group.
 - (e) They feel certain about more of their reported observations.
 - (f) This subjective feeling of certainty is more reliable and accurate as a result of the training.
 - (g) Making the warranted assurance and assured accuracy greater for the training groups.

TABLE II

Showing Per Cent of Improvement of Different High School Training and Control Groups in Various Elements of Gain, Experiment A

TESTS	Group I Freshman Training (75 cases)			Group II Freshman Control (75 cases)			Group III Senior Control (75 cases)			Group IV Junior Training (45 cases)		
	1	2	3	1	2	3	1	2	3	1	2	3
Right	65	74	77	60	65	68	66	65	63	53	82	73
Omitted	35	26	23	38	35	32	34	35	37	47	18	27
Wrong	29	19	14	33	17	13	27	13	14	18	7	17
Range	94	93	91	93	82	81	92	78	78	70	89	89
Accuracy	69	80	85	65	79	83	73	83	82	75	92	81
Inaccuracy	31	20	15	35	21	17	27	17	18	25	8	19
Assurance	63	69	80	66	69	66	42	59	53	36	73	77
Reliability of oath .	75	85	89	73	81	88	77	87	86	89	96	86
Warranted Assurance .	47	58	69	48	57	58	42	59	53	32	70	67
Unwarranted Assurance .	16	10	8	18	13	8	13	9	9	4	3	10
Assured Accuracy	69	73	81	74	72	70	58	71	65	43	75	82

SUMMARY

1. On each of the items or elements of improvement the training groups made more gain than the control groups.

- (a) They observe and report a greater per cent of the possible details correctly.
- (b) They report fewer details that are incorrect or wrong.
- (c) They note and report more total details.
- (d) The reports made by the training groups are more accurate than for the control groups.
- (e) The training groups also feel certain about more of their observations and reports than do the control groups.
- (f) This subjective feeling of certainty also becomes more accurate as a result of the training.
- (g) The warranted assurance and assured accuracy for the training groups is greater in each succeeding practice while it fails to increase for the control groups.

TABLE III

Showing Per Cent of Improvement of Different Junior High School Training and Control Groups in Various Elements of Gain, Experiment A

TESTS	Group I Training (10 cases)			Group II Control (40 cases)			Group III Training (40 cases)		
	1	2	3	1	2	3	1	2	3
Completeness	66	61	79	71	68	64	71	72	83
Omitted	34	39	21	29	31	36	29	28	17
Wrong	38	26	22	36	33	14	34	23	17
Range	104	87	101	108	102	78	105	95	96
Accuracy	63	70	79	66	68	82	68	76	86
Inaccuracy	37	30	21	34	32	18	32	24	14
Assurance	56	60	49	73	71	72	85	72	81
Reliability	67	76	82	71	70	84	70	80	91
Warranted Assurance	35	45	41	52	50	61	59	58	74
Unwarranted Assurance	18	17	11	21	18	11	6	15	72
Assured Accuracy	59	65	52	78	73	74	87	77	85

TESTS	Group IV Control (40 cases)			Group V Control (27 cases)		
	1	2	3	1	2	3
Completeness	68	56	60	80	60	70
Omitted	32	44	40	20	40	30
Wrong	21	25	16	40	35	20
Range	92	81	77	120	95	90
Accuracy	74	69	79	67	63	78
Inaccuracy	26	31	21	33	37	22
Assurance	66	65	58	76	64	63
Reliability	80	71	81	74	68	81
Warranted Assurance	53	46	48	56	43	51
Unwarranted Assurance	13	23	11	20	21	12
Assured Accuracy	71	67	60	84	68	66

SUMMARY

1. The training groups show a marked improvement over the control groups in:
 - (a) Range and completeness of report. A greater per cent of the correct details were reported by the training groups, the range and completeness of the report increasing for the training groups and decreasing for the control groups. Fewer correct details were omitted by the training groups in the third practice.
 - (b) Notwithstanding this increase in range, the reports of the training sections increased in accuracy much more rapidly than did those of the control groups, which means that more of the details reported as correct were correctly observed.
 - (c) The results about the subjective feeling of certainty are not so clear, probably due to the fact that the pupils forgot in many cases to mark the items of which they felt certain. The reliability of the feeling of certainty seems to have increased much more for the training groups.

TABLE IV

Compares Per Cent of Total Possible Details Observed and Reported Correctly in the First and Final Test for all Training and Control Groups

	Experiment A		Experiment B				Experiment C	
			Regular Questions		Suggestive Questions			
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group								
I. Training.....	69	86	53	59	52	76	50	71
II. Training.....	69	85	48	61	44	73	51	70
III. Control.....	70	74	50	53	44	52	55	59
High School Group								
I. Training Freshmen.....	65	77	37	49	37	63	45	62
II. Control Freshmen.....	60	68	41	42	30	41	48	58
III. Control Seniors.....	66	63	45	50	43	49	50	63
IV. Training Seniors.....	53	73	37	62	46	61	47	65
Junior High Group								
I. Training.....	66	79					39	57
II. Control.....	71	64					39	51
III. Training.....	71	83					36	63
IV. Control.....	68	69					37	63
V. Control, Experiment A, Training in Experiment C.....	80	70					38	58

TABLE V

Compares Initial and Final Ability in *Accuracy* of Report of All Training and Control Groups

	Experiment A		Experiment B				Experiment C	
			Regular Questions		Suggestive Questions			
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group								
I. Training	70	88	68	68	66	81	54	72
II. Training	74	88	61	69	51	77	55	70
III. Controlled	73	83	61	65	51	59	57	60
High School Group								
I. Training Freshmen	69	85	48	56	41	67	50	62
II. Control Freshmen	65	83	51	52	33	43	50	60
III. Control Seniors	73	82	59	61	50	57	56	65
IV. Training Seniors	75	81	54	67	51	66	53	56
Junior High Group								
I. Training	63	79					41	58
II. Control	66	82					41	54
III. Training	68	86					39	64
IV. Control	74	79					42	55
V. Control, Experiment A, Training in Experiment C	67	78					42	61

TABLE VI

Compares the Per Cent of Items felt to be Correct that were Correctly Observed and Reported in the Initial and Final Tests for all Training and Control Groups

		Experiment A		Experiment B				Experiment C	
				Regular Questions		Suggestive Questions			
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group									
I.	Training.....	78	94	80	80	79	89	59	79
II.	Training.....	82	93	72	74	70	85	60	78
III.	Control.....	78	89	71	71	78	76	64	71
High School Group									
I.	Training Freshmen.....	75	89	54	63	46	82	52	74
II.	Control Freshmen.....	73	88	62	51	49	52	54	65
III.	Control Seniors.....	77	86	75	69	67	78	70	74
IV.	Training Seniors.....	89	86	75	73	73	76	57	66
Junior High Group									
I.	Training.....	67	82					25	65
II.	Control.....	71	84					39	57
III.	Training.....	70	91					35	69
IV.	Control.....	80	81					31	56
V.	Control, Experiment A, Training in Experiment C.....	74	81					41	71

TABLE VII

Compares the Per Cent of Total Items Sworn to or Felt to be Correct in the Initial and Final Tests for all our Training and Control Groups

	Experiment A		Experiment B				Experiment C	
			Regular Questions		Suggestive Questions			
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group								
I. Training	51	73	52	62	34	54	65	69
II. Training	47	82	50	66	27	53	66	76
III. Control	65	71	56	62	27	41	77	72
High School Group								
I. Training Freshmen	63	80	31	41	17	36	50	64
II. Control Freshmen	66	66	36	44	20	38	50	65
III. Control Seniors	42	53	45	56	27	45	49	70
IV. Training Seniors	36	77	36	44	25	36	45	55
Junior High Group								
I. Training	56	49					31	35
II. Control	73	72					59	49
III. Training	85	81					65	67
IV. Control	66	58					45	32
V. Control, Experiment A, Training, in Experiment C	76	63					56	63

TABLE VIII

Compares the Assured Accuracy of all Training and Control Groups or the Per Cent of Items sworn to and Correctly Reported in Relation to the Total Number Observed and Reported Upon

	Experiment A		Experiment B				Experiment C	
			Regular Questions		Suggestive Questions			
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group								
I. Training	58	78	62	73	41	59	72	76
II. Training	53	86	59	71	37	59	71	86
III. Control.....	70	76	69	69	42	53	85	86
High School Group								
I. Training Freshmen.....	69	81	35	46	20	43	58	77
II. Control Freshmen	74	70	45	52	30	34	54	70
III. Control Seniors	58	65	59	63	37	62	62	80
IV. Training Seniors	43	82	49	48	36	36	48	64
Junior High Group								
I. Training	59	52					18	40
II. Control.....	78	74					56	51
III. Training.....	87	85					57	61
IV. Control.....	71	60					33	32
V. Control, Experiment A, Training in Experiment C	84	66					59	62

Relation of Intelligence and School Training to Observational Learning and Accuracy of Report

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THIS paper can best be understood by those who have heard the papers presented yesterday afternoon by Dr. Book and Mrs. Beard. In fact, my study is an integral part of an extended piece of experimental work that is now being conducted by the department of psychology, and which will continue over one or more additional years.

However, to refresh the memories of those who were here yesterday afternoon and to give those who were not here a chance to orient themselves in relation to the problems in hand, I shall review briefly the connecting points.

As already pointed out by Dr. Book, we had at the outset several problems in mind, namely:

1. Can one's ability to note the things in the world about us and to report such facts accurately and quickly be measured by a method that is reliable and practical for use in the schools?

2. Is this ability to observe and report accurately upon the things found in one's environment a fixed quantity or may it be cultivated and improved by special training and practice, and if so, by what method and to what extent?

3. Is this important type of ability or form of acquisition being improved by the work now done in the school systems?

4. If it is, which of the studies in the curriculum contribute most to the improvement of this fundamental type of acquisition?

5. Are all the pupils who now crowd our public school systems, regardless of their native mental endowment, capable of receiving and profiting by instruction in more ready and accurate observation and report?

Dr. Book explained the development of the tests which are on display at the rear of the room. He also demonstrated for you two of the observational tests which we used. I scarcely need to add that we believe we have solved the first problem mentioned and will have a reliable and practical method of measuring the ability of persons to observe and report as soon as these tests are revised and standardized.

Mrs. Beard made plain in her paper that from the results of the tests given in the University and in the public schools of this city, including both the high school and the junior high, we have sufficient evidence to warrant us in saying that the ability to observe and report is not a fixed quantity, but that it can be improved by special training and practice.

This brings us to the third question mentioned, namely, whether or not this important group of abilities is being improved by the work now done in the public schools.

1. Comparing the Observational Ability of Different School Groups

If you will refer to Table IV, which was placed in your hands by Mrs. Beard (compare Table IV below), you will see that the results of Experiment A for both the *initial* and *final* ability of all college and high school groups seem to indicate that there is little improvement from grade to grade in ability to observe and report this kind of material. We will return to this particular experiment in a moment.

If, on the other hand, you will refer to the right side of the table where the results from Experiment C are listed, you will find that there is positive evidence of an increase in ability to observe and report on this kind of material as we rise from the junior high school to the high school and pass on to the university. Looking now at the results of Experiment B, we find that this same condition holds for this type of observation and

TABLE IV

Compares Per Cent of Total Possible Details Observed and Reported Correctly in the First and Final Test for all Training and Control Groups

		Experiment A		Experiment B				Experiment C	
				Regular Questions		Suggestive Questions			
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group									
I.	Training	69	86	53	59	52	76	50	71
II.	Training	69	85	48	61	44	73	51	70
III.	Control	70	74	50	53	44	52	55	59
High School Group									
* I.	Training Freshmen	65	77	37	49	37	63	45	62
II.	Control Freshmen	60	68	41	42	30	41	48	58
III.	Control Seniors	66	63	45	50	43	49	50	63
IV.	Training Seniors	53	73	37	62	46	61	47	65
Junior High Group									
I.	Training	66	79					39	57
II.	Control	71	64					39	51
III.	Training	71	83					36	63
IV.	Control	68	60					37	63
V.	Control, Experiment A, Training in Experiment C	80	70					38	58

material, altho we do not have a record for this experiment from the junior high school. Experiment B was not given in the junior high school, because of a lack of time to give the tests and to score the results.

But it will be seen that the difference in performance for Experiment B, between the high school and the university groups, is even more marked than for Experiment C, both as regards their initial performance and in the improvement which resulted from the training and practice. The jump in improvement between high school and the university on Experiment C was, for initial performance, 5 per cent, and for the final performance roughly the same; but when we turn to Experiment B we find that the jump here is, for initial performance, 10 per cent, and after the training the university students are still 7 per cent better than the high school group. This state of affairs holds as well for Tables V, VI, and VII, showing respectively the accuracy, assurance, and reliability of the reports, as for the range and completeness of the observations and report, bearing out the implications of Table IV. (Compare Tables V, VI, and VII below.)

TABLE V

Compares Initial and Final Ability in *Accuracy of Report* of all Training and Control Groups

		Experiment A		Experiment B				Experiment C	
				Regular Questions		Suggestive Questions			
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group									
I.	Training	70	88	68	68	66	81	54	72
II.	Training	71	88	61	69	51	77	55	70
III.	Control	73	83	61	65	51	59	57	60
High School Group									
I.	Training Freshmen	69	85	48	56	41	67	50	62 ^a
II.	Control Freshmen	65	83	51	52	33	43	50	60
III.	Control Seniors	73	82	59	61	50	57	56	65
IV.	Training Seniors	75	81	54	67	51	66	53	56
Junior High Group									
I.	Training	63	79					41	58
II.	Control	66	82					41	54
III.	Training	68	86					39	64
IV.	Control	74	79					42	55
V.	Control, Experiment A, Training, Experiment C	67	78					42	61

TABLE VI

Compares the Per Cent of Items felt to be Correct that were Correctly Observed and Reported in the Initial and Final Tests for all Training and Control Groups

		Experiment A		Experiment B				Experiment C	
				Regular Questions		Suggestive Questions			
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group									
I.	Training	78	94	80	80	79	89	59	79
II.	Training	82	93	72	74	70	85	60	78
III.	Control	78	89	71	71	78	76	64	71
High School Group									
I.	Training Freshmen	75	89	54	63	46	82	52	74
II.	Control Freshmen	73	88	62	51	49	52	54	65
III.	Control Seniors	77	86	75	69	67	78	70	74
IV.	Training Seniors	89	86	75	73	73	76	57	66
Junior High Group									
I.	Training	67	82					25	65
II.	Control	71	84					39	57
III.	Training	70	91					35	69
IV.	Control	80	81					31	56
V.	Control, Experiment A, Training in Experiment C	74	81					44	71

TABLE VII

Compares the Per Cent of Items Sworn to in the Initial and Final Tests for all our Training and Control Groups

		Experiment A		Experiment B				Experiment C	
				Regular Questions		Suggestive Questions			
		Initial	Final	Initial	Final	Initial	Final	Initial	Final
College Group									
I.	Training	51	73	52	62	34	54	65	69
II.	Training	47	82	50	66	27	53	66	76
III.	Control	65	71	56	62	27	41	77	72
High School Group									
I.	Training Freshmen	63	80	31	41	17	36	50	64
II.	Control Freshmen	66	66	36	44	20	38	50	65
III.	Control Seniors	42	53	45	56	27	45	49	70
IV.	Training Seniors	36	77	36	44	25	36	45	55
Junior High Group									
I.	Training	56	49					31	35
II.	Control	73	72					59	49
III.	Training	85	81					65	67
IV.	Control	66	58					45	32
V.	Control, Experiment A, Training, Experiment C	76	63					56	63

Upon the face of the proposition it would, therefore, appear that the schools are either improving the ability of children for the types of observation measured in these tests and for the materials used in Experiments B and C, or that there is a correlation between general intelligence (if we dare use that much-abused term) and ability to observe and report. It is quite likely that as an individual matures he or she reaches a higher state of efficiency in observation and report *without the aid or even despite* the curriculum of the school. But we must conclude, it seems to me, that the large amount of improvement indicated in the paper read yesterday by Mrs. Beard indicates that the school is not doing all that is possible by way of training this important group of abilities.

2. *Observational Rating of the Best and Worst Mentally Endowed Individuals in Our Several Sections and Groups*

In the endeavor to determine the relationship existing between intelligence, as measured by the Indiana University Intelligence Tests, and the ability in question, we proceeded as follows, working first with Ex-

periment A, then with Experiment C, and finally with Experiment B, taking them in the order of the seeming correlation given in Table IV. We first took the various groups and sections described in the former papers and divided each section into halves, placing the better mentally endowed individuals in the upper half and the worst mentally endowed in the lower half of each group. We then added the scores made by the better half for the initial trial of Experiment A and compared it with the score made by the poorer half. Now if there had been any correlation between general intelligence and performance on Test A we should expect to find a superior score for the upper halves of the various groups. But all our data seem to indicate that no such relationship exists. In fact, in several instances the junior high school groups did as well or even better than those in high school, thus bearing out the implication shown by Table IV and already referred to.

To avoid any danger of our findings being invalidated by the large probable error which was likely to be present in these smaller groups, we next threw together all the control groups of the University, high school, and junior high, making in all 288 cases. These we arranged according to intelligence ratings, which arrangement gave us a range of from 14 to 112 points. We then divided this total group into halves, using the number of cases. As the group had conformed very closely to the normal distribution curve on intelligence ratings, this division gave us also a grouping by halves on intelligence scores. We then added the initial performance of the individuals of the upper half, likewise those of the lower half—and the results were exactly as before. There was so little variation between the two halves, in observational ability of the type called for in this experiment, that there could be no statement made regarding the effect of intelligence on performance in Experiment A unless you said that there was a slight negative correlation. The exact figures obtained in the four main factors of improvement were as follows:

	HIGH HALF	LOW HALF
Range	93.18	97.81
Accuracy	71.6	69.21
Assurance	63.75	68.06
Reliability	71.11	74.55

These figures, while seeming to indicate a slight advantage in favor of the lower half of the group, are still so close together that the probable error would reduce it to either no correlation or to a very slight negative correlation.

But this result, for Experiment A, is exactly what might be expected, as the type of observation called for in this experiment does not require the use of any of the higher categories of observation which demand observation of causal relationships, interpretation, or even a pointing out of the exact differences between the objects observed, as was the case in Experiments B and C.

Turning from Experiment A, we next took the University groups that had taken Experiment C and divided them into halves on the basis of their mental endowment and proceeded to calculate their initial and final

performance on Experiment C. The results of this comparison, as expressed in Table IX, give what seems to be conclusive evidence that the best mentally endowed half of each group surpasses in initial observational performance the lower half of the same group. Taking Group III as an example, you will find under "Number of Details Reported Correctly" that the upper half had 58.9 per cent of the total possible number of details reported correctly, while the lower half had only 52.8 per cent correctly reported; and if you will note the *accuracy* line you will see that the upper half surpasses the lower half by 7 per cent in the accuracy of their entire report.

TABLE IX

Initial and Final Ability of the Best and Worst Mentally Endowed College Subjects taking the Tests, Experiment C

ABILITY	BEST HALF					
	Group III		Group I		Group II	
	Initial	Improvement	Initial	Improvement	Initial	Improvement
Right	58.9	57.5	48.8	67.7	53.6	70.1
Wrong	37.9	40.0	44.7	30.6	38.9	27.7
Accuracy	61.0	59.2	51.6	68.6	57.1	70.4
Assurance	78.6	82.2	61.3	70.0	61.8	76.5

TABLE IX Continued

Initial and Final Ability of the Best and Worst Mentally Endowed College Subjects taking the Tests, Experiment C

ABILITY	WORST HALF					
	Group III		Group I		Group II	
	Initial	Improvement	Initial	Improvement	Initial	Improvement
Right...	52.8	55.7	49.8	71.8	49.0	68.4
Wrong...	44.6	38.1	42.1	26.5	45.2	30.8
Accuracy	54.2	57.6	54.2	72.9	52.1	69.0
Assurance	71.6	68.8	67.0	67.1	63.8	75.4

Altho the data are not yet completely worked out for Experiment B so that it can be presented here in tabular form, there is every indication at present that there is a still greater degree of correspondence or correlation between the general intelligence of the persons taking Experiment B and their record on the observation tests than was found for the type of observation used in Experiment C. These results, obtained with

the aid of a standardized intelligence scale, verify the findings of H. Breukink,¹ who selected his subjects from different social and educational strata. His group of professors, instructors, and university students made a better record on his observation test than did the group composed of nurses, housemaids, wardens, janitors, etc.

But there still remains the question of whether the best mentally endowed persons do not have an advantage in taking the special training in observation and report which we arranged. If you will glance again at Table IX you will note that it carries the final scores of Group II, a training group. Here you can immediately see that, altho the upper half of the class made goodly gains under the influence of our uniform scheme of training, still at the end of the training period in each case the lower half was much more nearly on a par with the high half than at the beginning of the training, indicating that they had improved more rapidly than the better mentally endowed halves of our several training groups.

It is then the more poorly endowed who seem to reap the greatest amount of benefit from such training, which suggests that the better endowed individuals have already worked out for themselves a method of improving their powers of observation and have come to realize practically, altho not theoretically, the elements that make for improvement, while those possessing less native mental endowment have not been able to do this for themselves. But when given the necessary help by special training and the necessary incentives provided by a method of measuring their progress in this line they show rapid improvement. The indication is that they would soon overtake the more fortunate half of our total group. Regardless, however, of what the cause may be, the fact remains that training in observation may be given with great success to that section of our school population which stands most in need of aid in this fundamental type of learning.

3. The Probable Effect of Different School Subjects Upon Improvement in Observational Learning

When it comes to the problem of determining the probable effect which the various school subjects actually exert upon increasing one's power to observe and report accurately, our present fund of data is small. We hope later to obtain a record from the entire senior class in the University, 400 cases, which will throw considerable light on this problem. For the present report we simply took from the University groups those who were of sophomore standing or above and grouped them according to their major subjects in the University. Table X shows the number of cases, the major subjects, and the relative standing of each on the same four co-efficients of observational ability which we have used in making our other comparisons.

¹ H. Breukink, "Über die Erziehbarkeit der Aussage", *Zeitschrift für d. Vergleichende Psychologie*, Vol. 3, 1909, pp. 32-87.

TABLE X

Shows Range, Accuracy, and Reliability of Observation of Different Major Groups of University Students

Major Subject	No. of Cases	Range	Accuracy	Reliability	Assurance
Mathematics	49	98	53	65	55
Foreign Language	44	97	58	62	68
English	59	96	54	57	65
History	50	95	54	60	65
Science	45	91	48	54	59
Laboratory Sciences	24	90	53	54	71

It should be pointed out that these results are not wholly reliable because of the fact that so many of the individuals who took the tests were sophomores and so had had comparatively little work in the University in their major subjects. It is our intention at present to try to enlist the aid of the present graduating class, getting a measure of their initial observational ability after they have studied their major subjects intensively for from three to four years. By comparing the ability to observe the types of materials presented in our several experiments, of each of these major groups, and determining the differences which occur in the accuracy, range, and assurance of the reports given by these several major groups, it is hoped to obtain data which will at least point the way to a solution of the question which school subjects give most help in promoting this fundamental type of acquisition.

Three Remedial Principles in Education

WILLIAM W. BLACK, *Professor of Elementary Education in Indiana University*

SOMEONE has estimated that our schools are not more than 10 to 12 per cent efficient. This estimate is perhaps fair. At any rate, they fall far short of meeting the educational needs of present-day civilization. On the other hand, they are about as efficient as they can become under our present guiding conceptions, conceptions which arose before society and education had received scientific attention, and when civilization and civilized needs were far less complex than now, but which by the force of tradition are still retained.

It is the purpose in the first part of this paper to indicate three changes in the dominating conceptions in education which I think must be made before we can advance materially in making our school education properly efficient.

The first of these is a change in the basis of curriculum-making from the side of the subject-matter to the fields of the child's adjustments in his life out of school.

The second is a truer application of the principle of interest than is possible under the present conception of the curriculum.

The third principle, the application of which is made possible only thru the other two changes, is that the method of instruction should be natural and direct, the same as the method employed by the child in his life out of school, and the same as that of the adult in practical life.

After a brief presentation of these three principles I shall indicate the nature of the procedure which I think is necessary in securing their application in schoolroom practice.

I. The Demand for New Working Conceptions

At a meeting of college presidents of the United States held soon after America entered the World War, one of the first questions to receive attention was, What is wrong with our education? And thruout our country we began at once to consider the problem of making public education more efficient. The same thing occurred in most, if not all, of the other countries engaged in the war, most notably, perhaps, in England and France. In seeking for the weak spot in human life that made the war possible, no more vital question could have been asked. And whether the struggle begun in 1914 shall be repeated thirty or forty years hence, if not sooner, depends, not upon treaties and agreement to reduction of armaments, but upon the schoolmaster's answer to the question referred to, and to the remedy he applies. Unless we can make our education more efficient, our treaties and pacts will again be made "mere

scraps of paper". Reduction of armament will help temporarily by depriving nations of their guns. But will not these same nations find a way later on? Has not Germany already begun "bootlegging" in a store of guns and ammunition?

Why do nations go to war? Not because, as nations, they really want war, but fundamentally because they find themselves mired in some great and difficult situation, and without knowledge of how to extricate themselves. This was true in the case of our Civil War, and it was true also of the World War. When an individual gets into a difficult situation, and does not know how to get himself out of it, he swears, if he has developed a vocabulary that he thinks is adequate. A nation, under similar conditions, goes to war. When organized elements within a country are similarly confronted, the inability to settle their affairs manifests itself in the boycott, the strike, the lockout, and localized warfare, and all these are accompanied by villification of the opposing group.

One hears it said on every hand that the present unrest is a result of the war. This false notion tends to blind us to the real cause and condition. The war has complicated the situation for us, but it is in no sense the cause of it. The unrest began long before the war broke out in Europe. We are slowly coming to see, I think, that the great unrest in the civilized world was the fundamental cause of the war. We must find the first cause of this unrest and remove it; otherwise the war will of necessity be repeated as soon as the nations can organize for it.

The weak spot is, of course, that under present-day complexity of human relations we do not know how to live well and happily together. We are unable to solve the dualism of the Individual *vs.* Society; of one class *vs.* another class; of one nation *vs.* the rest of the world. Three principles for establishing living relations have been proposed: that of Autocracy, that of Bureaucracy, and the principle of Democracy. The first two have proved inefficient. At the present time the whole drift of civilized peoples is toward Democracy as the one mode of solving this dualism. But we must emphasize the fact, however, that civilization is just *drifting*. There is no rationally controlled movement. Our feeling for Democracy has run so far ahead of our knowledge of it that we are groping blindly for a goal and a mode that do not stand out in guiding clearness. This, it seems to me, indicates the situation with which we have to deal. It indicates, too, the weakness in our education. And in pointing out this weakness, it indicates the problem of the educator, namely: to reorganize his aims, curriculum, and methods, in light of the one purpose of developing in the one taught the knowledge, the attitude, and the habit of democratic living; the mode of living well and happily together. After all, to live well and happily together is the whole problem of individuals, social groups, and nations. We would live so if we knew how. We do not know how because we have not been taught how. Since this is the whole of life, why should not our schools be shaped *to* it and *by* it?

II. A Change in Curriculum

Before 1914 the world had reached high-water mark in individualism—personal, group, and national individualism. This extreme develop-

ment of individualism was fast driving civilization upon the rocks. Hence the war. After the war closed we undertook to right ourselves by increasing our individualism; by employing more vigorously the ideals and methods that had already produced such unsatisfactory results. This is the common mode of attempting to get out of a bad situation. The I. W. W., the profiteer, the various social groups, and the nations, in so far as possible, increased their individualism, and each, mind you, was but carrying out his conception of democracy. In education, too, we are trying to make our schools more efficient by doing more of the same thing that had already proved inefficient. Methods come and go, but we apply each new method under old conceptions. Regardless of any statement of theory, in practice we read the same old meaning into "Social Efficiency" as the aim in education. The child is given the same position in relation to society and the rest of the world that was formerly assigned to him. The subject-matter holds its old dominating position. The methods employed are, on the whole, as unfitting as ever, and the devices as extraneous. All these things must be changed.

First of all, we must rid ourselves completely of the traditional conception that the school child is merely *preparing* to become an active member of society *later on*, and replace it with the working conception that when the child enters school he is already as truly a member of society as he will ever be, and in exactly the same sense as is the adult. The difference between child and adult is in the plane of living, in the extent of his interests and problems. Each is naturally concerned with the problems and other interests that concern him *now*, because of his present relations. It is the sole business of the school to center its attention and efforts upon the problem of directing the child in his attempts to adjust himself to the situations that naturally arise for him in his life outside the school now, and to guide him into new relations and new situations to which in turn he must be led to adjust. If we grant that this is true, we must shift our point of view of the curriculum from the subject-matter, and make it up, grade by grade, from the problems and other matters of interest that should come to the child from his present environmental contacts and his present needs for adjustment. We cannot make the child live in the *future now*. Let us see the sources of the true curriculum a little more definitely.

The child has the same three classes of active and immediate interests as those of the adult. First, he has certain and varied social relations, with the problems and interests that grow out of them. Second, he has to adjust himself to a physical environment. His life and his personal welfare and happiness depend upon it. Growing immediately out of the two interests is a third, namely, a recreative or liberal arts interest in finding the meanings of things whose significance he can understand; he likes to see the relations in and among things that appeal to him. These three classes include all the interests that child or adult can ever have. They are as serious, and vital, and compelling for the child in the first grade as for the adult of mature years. Many of the problems in each field of the child's interests have risen into consciousness, usually perhaps in the form of questions. But very many problems and relations

in which he has a natural interest have not become conscious with him, in which case his interest exists in the form of organic and mental readiness. These the schools must develop into consciousness.

The curriculum must come from these three fields of interests, and the effort of the school must be to advance the child's movement within these fields. All things must be subordinated to this end.

The first mentioned of these fields of interests, that of his social relations, must furnish that portion of the curriculum which is most directly and basically suited to teach the child the nature, method, and practical desirability of democracy, and to develop in him the democratic attitude and democratic habits.

The mass of adult individuals think of democracy merely as a form of government, in so far as they think of it at all. When they hear it said that "democracy means coöperation for the common good", they usually interpret "common good" as meaning "good for the other fellow". They do not understand that in the present complexity of practical life the best good of the individual is inseparably bound up with the best good of other individuals. They do not see that there is no natural antagonism between the individual and society, or between group interests. They do not see democracy as a mode of living well and happily together. Much less do they see democracy as a mode in the active life of the individual, in which the activity he performs at *one* time and in meeting one situation must hold a coöperative and cumulative relation with his activities performed at *other* times and under *other* circumstances. And the point I wish to give emphasis to in this connection is that he does not see these things because he has not been taught them. We have not dealt directly with the human relations that make democracy necessary, but have, in the main, taught the fact as an end; taught it out of its vital relation, with the expectation that the one taught will later apply his knowledge to actual living, which, our experience shows, he does not do in any adequate way. Technical schools have made it a conscious problem to develop and use the principles of physical science in meeting some definite demand. The application of science in mechanical inventions, as exhibited in the war, shows how thoroly efficient they have been. If the world's public schools and colleges had worked as efficiently in developing and applying the science of human living to our social problems, there could have been no World War. The present problem of the school is consciously and directly to suit the curriculum and the method to the development of a new humanism. This conception, I think, is to characterize the new education.

In the brief time I may use, I can but suggest the nature of the procedure. First, the child must consciously study the present life-relations of mankind as they progressively touch his own life. He must more and more become conscious of how interminably men and nations are inter-related, and therefore how thoroly interdependent they are. Second, he must be led to the discovery that this interdependence makes it necessary that the welfare of each depends upon the welfare of the other. This principle he must come to see as underlying all specialization, all legitimate coöperation, and sharing in common in the effort and the

product. In no other way can he come to a practical understanding of democracy as the most efficient mode of living together under modern conditions and modern human needs.

But, it will be noted, the subject-matter, which is now the basis of the curriculum of the public school, must be subordinated; it must be used as means instead of a goal. The problems dealt with in the school must arise consciously from the child's life relations and interests out of school; his problems in school must be those he has with him out of school. He should then avail himself of the school as furnishing a condition under which he can solve his questions most efficiently, and most economically in the matter of time and expenditure of energy. His textbooks of instruction must then become reference books, and the matter must be selected as needed to meet the situation. This conception gives us the true meaning of "socialized subject-matter".

The first means of remedy to be applied, then, is a shift in the point of view of the curriculum from the subject-matter to the contact and interests that come to the child in his present life-relations; a shift of view that will permit the child to attack consciously and directly the problems that grow immediately out of his own daily life as he is living it, or should be living it, outside the school and at the present time.

III. A True Recognition of the Principle of Interest

Interest is of two kinds: primary, or intrinsic, and secondary, or instrumental. Primary interest in a thing arises from the felt value of the thing itself, as the value that comes from hearing good music, or from the appreciation of a piece of good literature. Such interest is direct. Secondary or instrumental interest arises when a thing is viewed as a means in securing something of primary interest, as the instrument that produces the music, or the language thru which the content of the discourse is enjoyed. It is indirect. Primary interest stands on its own base. It is absolute. Secondary interest grows out of, and depends upon, primary interest. Secondary interest must have the constant support of primary interest. When primary interest disappears, secondary interest is gone.

Most of our inefficiency in giving instruction is due to a violation of the relation and function of primary and secondary interest. And the violation is forced upon the teacher by the present curriculum.

Our curriculum is at present made up and administered almost wholly from the point of view of the subject-matter. Under this condition the mastery of the subject-matter *on its own account* is made the guiding aim of both pupil and teacher. The first resulting evil is that a knowledge of the subject-matter is made the end of learning and teaching. The instrument is made an end instead of a means. This forces both teacher and pupil to attempt to substitute secondary for primary interest, which is a psychological impossibility. True interest then disappears, and a second evil is forced upon the teacher, that of inventing extraneous means for "making" the matter interesting, which is another impossibility. But the teacher, let us note again, cannot avoid these evils under the present conception of the curriculum.

To see more clearly the significance of the change of view in the matter of curriculum and the functioning of interest, let us note some of the more radical changes which it would produce in our school work.

It would put the emphasis on the child as *learning* instead of on the teacher as *teaching*.

It would "scrap", or greatly modify, most of our present standard efficiency tests. But it would give a basis for making really efficient efficiency tests, tests that would indicate the child's progress in practical living, which cannot be done at present.

It would banish the teaching of reading as a separate subject, and thus make it possible to teach the child to read. That children do not at present really learn to read is the testimony of everyone who has made investigation, or even close observation. Many learn a fluent recognition of words, but they are not taught to read. The comparatively few who learn to read learn it out of school, and generally after leaving school, when conditions force it upon them. The average college student, including both undergraduates and graduates, cannot extract from a piece of discourse, in assimilable and usable form, a bit of content that adds very materially to his present stock of meanings; he does not know how to do reflective reading. A large majority of adults have developed little incentive to read, as well as little ability to read. To illustrate what I mean, how do you suppose Jane Addams's royalty on her *Democracy and Social Ethics* compares with Sinclair Lewis's royalty on *Main Street*? The reason in the case of Miss Addams's book is not that it is hard reading, for it isn't. The reason is that with our present curriculum pupils do not develop an active interest in social problems. But of the three hundred thousand or more who read *Main Street*, how many discovered that Mrs. Kennicott could help the people of her town very little because she had very little to help them with? Not one-tenth of 1 per cent.

The change would displace the theory that "the child must first learn to read, then read to learn" with the conception that the child learns to read only when reading to learn. The child can't "first learn to read then read to learn", just as he can't learn to talk and then talk to learn; or just as he can't learn to walk and then walk to get somewhere.

It would change completely the teaching of composition. In the first place, composition would be taught as a means, not as an end. In the second place, the pupil would work under the inspiration of the first qualification necessary in learning to speak and write, that of sincerity of purpose. But how is it at present? Composition is made a separate subject, which is at once a guaranty that the child's work will be lifeless, mechanical, and worse than profitless. At present the pupil is nagged at with his learning of composition from the kindergarten to graduation from high school. When he enters college, the English department knows that he is deficient in his use of English, so it rolls up its pedagogical sleeves and gives him another year of the same grind that has already proved so efficient in making him inefficient in his use of language. I say to you in all seriousness that the last condition of that student is worse than the first. I believe it would prove a profitable experi-

ment if some college department of English were to give half the entering class the regular freshman course in composition and permit the other half to substitute other college work for it, and, in the senior year, to test both sections in ability to write.

In our conference two years ago Professor Thorndike gave us a list of subjects, including algebra, physics, composition, and others, and asked us to indicate on a basis of ten the estimated value we received from each as a school study. While marking these, I sat beside a president of a university who placed a naught after the subject of composition. I think he would admit that he marked too liberally. Isn't it about time to make some kind of change?

The change in conception would revolutionize our handling of geography and history, and make them of first importance as informational subjects in developing the democratic conception and attitude. But I must pass on.

IV. Method Natural and Direct

The difference between children and adults in the matter of learning is in their stages of development and planes of experience, not in method. Common observation shows that nature has not developed one method for the child and another for the adult. The school must not supplant nature's method, or even modify it. It is because of Mr. Burbank's knowledge of, and fidelity to, nature and nature's method that he has been able to produce such wonderful results in plant life. What he did was to furnish conditions under which nature in her own way was able to give results in a short time such as, left to herself, she might never have produced for lack of conditions. So in our school work we shall profit most by seeking to discover the method instead of attempting to invent it. And the place to discover it is in the active life of the child and the adult outside the school, where there is freedom from the present restraints and other limitations of the schoolroom. With a new curriculum the change from our mechanical methods is made easy. It is not possible under present conditions.

From the point of view of the teacher, the principle of course holds the same. Naturally the question-and-answer method, the lecture method, the use of references, the laboratory method, the research method are to be used in the first grade as well as in the graduate school, and under the same nature of conditions.

Under the changed conditions, the child from the primary grades on can center his active attention on the thing we want him to get; on the thing of primary interest. This permits the direct method of attack by both pupil and teacher. There can be no greater clarification of the child's problem for him, and no greater time-saver, than the use of the direct method, for then all extraneous and purely mechanical devices and the mechanical use of good devices can be dispensed with. Just a bare illustration or two of what natural and direct method would do to present processes.

Both figuratively and literally the change would spoil the use of the "pie" as a device in teaching the fraction. Think of it!

It would eliminate the "phonic method" in teaching the child to read, but it would give him the proper use of phonics, which he does not learn now.

It would eliminate the teaching of diacritical marks in the primary grades.

It would eliminate the use of play as a *device* in giving instruction. The teacher is now often driven to use it so because the child has no sustaining interest in the thing to be learned. Such use of play, if it has the real play value, causes the child to miss the point he is supposed to get, or at most to grasp it infirmly. If he gets the point of knowledge, then he misses the true play value, in which case he only plays that he is playing.

V. Application of Remedial Principles

We can make no material advance in our public schools until we apply scientific knowledge to classroom work. We have reached the limit of improvement under our traditional conceptions. The transition is hard to make, but it must be made. We may have to move somewhat slowly, in places, but we must *move*. There is a body of scientific knowledge sufficient to guide us fairly well if it were understood by the great body of public school teachers. Now, as always, the one final factor in the school education of the child is the teacher. The whole system of school influences must function finally thru him, so it is thru him that we must find a way to apply the science of education in making the transition. Let us try.

The mass of classroom teachers have only the traditional view of the curriculum, and a wholly, or at best a very inadequate, working knowledge of the science of education. And with their heavy daily schedule they could make only a small amount of further scientific preparation separate from their classroom work, even if instructors were available. How shall we secure the change with these teachers in charge?

By law and adequate salary we can increase the teacher's preparation somewhat, but not adequately. We cannot even approach adequacy.

It would be idle, of course, to think of trying to solve our problem thru extension courses given by normal schools and other schools of education. They have a place, I think, but they can't even scratch the surface of the problem that now lies before us in education.

Attendance at summer schools for teachers has a certain value, but very little change in fundamental conceptions results. The big problems that confront the teacher cannot be solved for him or by him thru summer sessions.

While we must avail ourselves of every possible means, our main reliance, I believe, must be on two modes of training: (1) systematic training in schools for teachers, and (2) the systematic training of teachers in service. Neither alone will suffice. And I believe that we must now and always rely more largely upon the latter means for training the mass of our public school teachers, especially in the translation of principles into practice.

1. The training of teachers in our schools for teachers must be

made more efficient. We must extend the time of preparation of teachers in our training schools. And as soon as it can be arranged, we must make the body of prospective teachers a selected group. Our training schools must be responsible for such reorganization as may be necessary to give the teacher the best possible preparation for attacking the problem of directing the child's adjustments in the three fields of his interests. And because they must be responsible for their product, they must be given the greatest of freedom in shaping and administering their courses. The following, I think, should indicate the nature of preparation, whether the time is long or short.

(a) The prospective teacher should be made aware of the great problems with which adult society has to cope, and with the principles and the actual and possible means for dealing with them. If the teacher is to direct the child in his progressive movement in meeting these problems, surely he must know what these problems are. He must also know the problems that confront the school child in his present fields of interest. There can be no question on this point. He must therefore be directed in a reflective study in three lines of work corresponding to the three fields of man's interests: (1) the social sciences of sociology, history, and geography, and of that portion of literature which deals constructively with social ideals; (2) the physical and biological sciences; (3) literature and the other fine arts.

(b) The student in the training school must make a professional study of the principles of the sociological, biological, and psychological sciences.

(c) He must be educated into methods and habits of reflective thinking, and into the attitude of persistent study of his problem thru his entire life as a teacher. In no other way can he develop self-sustaining power.

It is impossible of course to do all this in the college or normal school, not only in a short course, but in a course of any length. That should not frighten us much, for we have always been trying to do the impossible in the training of teachers. And just now we are trying it harder than ever. But what I mean is, that what training we can give should be of this fundamental nature, be it much or little. Our training schools must give up the idea of attempting to send out teachers of the finished product type. We must quit making a new pill to prescribe for each little symptom that arises. How do we make our courses for teachers at present? I will show you. Some man goes out into the field and discovers an eruption on the pedagogical body. He immediately writes out a recipe for salve. He discovers another pimple and writes another recipe. Then another pimple, and more salve. And so on. A photograph of our whole system of teacher-training courses in Indiana would make a fine companion piece to the Patchwork Girl of Oz. In this way we blindfold ourselves and tramp around and around in a three-foot circle until our legs are exhausted, and then delude ourselves into thinking that we have made quite a journey. This is not chargeable to any one of us, nor to any one group. It is due to tradition and a lack of knowing the fundamental mode. But isn't it strange that we haven't dis-

covered that if we purify and vitalize the blood corpuscle the pimple will disappear? Browning was right: "If we draw a circle premature, heedless of far gain, greedy for quick return of profit, sure bad is our bargain."

But, it will be asked, how about special training in primary methods for primary teachers? Shall not the primary teacher devote the time of her preparation *largely* to primary work? Emphatically *no*. There is no serious problem of primary method in distinction from right method in the intermediate grades, the grammar grades, or anywhere else, except when forced. The principles of selecting proper subject-matter, the principles of selecting devices, and the principles of controlling technique are, naturally, the same for all grades. There is of course a difference in adjustment in the work of the different grades. But, in the first place, the adjustment is a matter of applying common sense rather than technical knowledge. In the second place, the most significant differences must be understood by teachers of all grades. These differences should therefore be studied by all prospective grade teachers in their courses in general and special method. In the third place, the prospective primary teacher must constantly study the special adjustment in her laboratory study while engaged in supervised teaching. There is no primary problem distinctly separate from the whole problem. The child's life, normally, is continuous, gathering as it goes. His life does not divide itself into separate sections, as we have sometimes interpreted the school grades to mean. The teacher who devotes her time largely to immediate preparation for primary work "draws a circle premature". She tramps around in the three-foot circle. She is a repetition of the case of the young Newton, in hunting on the seashore for smooth pebbles and pretty shells, and all the while innocent of the great ocean lying before her. In so far as the main body of her *training* is concerned, I should not want a primary teacher who could not succeed as well in the higher grades as in the first grade.

2. The training of the teacher can only be started in the schools of education. But it must be carried on so long as he remains in service, and *while* he is in service. We must move rapidly, therefore, into a system of competent supervision. I would suggest a plan somewhat like the following:

(a) The administrative unit should select a director of elementary education, who has at least the following qualifications: (1) good scholarship, with at least one year of graduate work devoted to the study of the science and art of education and the scientific method of work; (2) the student habit and the elements of leadership; (3) a background of profitable experience in elementary school work. It is useless, and worse, to employ one who does not have a constructive working grasp of the principles of the science of education, and the scientific method of work.

(b) Such director should be given charge of a small group of teachers with whom he should work intensively, say the equivalent of a ward school of twelve to twenty teachers. With these teachers he should work out a systematic program of study, practice, and experimentation to extend thru a series of years, say five. As this school should prove its

work, it should furnish laboratory study for other teachers of the system. The director, meanwhile, should lead the whole teaching force to a systematic study, not merely of the so-called professional side of the teacher's preparation, but to the other phases as well. As the one school grows in ability to support itself, more and more the director should increase the time given to other schools in the system. And with all the scheduling of work, the director himself must be given ample time for personal study. Think of the result of such a system of teacher-training at the end of twenty years.

What I have indicated for the elementary school is just as necessary for the high school.

I understand that one city in Indiana is already developing a plan for training teachers in service similar to the one I have outlined. It is to be hoped that other school corporations will attack systematically this same problem of educating teachers in service. They should feel free to call upon normal schools and other schools of education for aid in organizing and establishing an efficient system. Schools of education could render no greater extension service.

In conclusion, the world today is a-tremble with the weight of at least four great social problems, all of which are pressing for solution. One of these is the inter-racial relations. The second is that of international relations. A third is the three-sided problem of labor, operator, and consumer; of producer, distributor, and consumer. A fourth is that of taxation. Not one of these problems will solve itself. How long they will wait for solution, no man knows. Nero fiddled because he had not known how to prevent the conflagration. The world must now find a way or tune its fiddle. America, with the other nations, is in need of a large, constructive leadership. It hasn't it. We must develop it. The constructive statesman must have intelligent support in handling great social questions. We haven't it in sufficient quantity. We must educate for it. Our public schools are as efficient as seems possible under our traditional conceptions, yet our education does not meet the demands made upon it. The technical schools and the methods of mechanical invention have met successfully the world's mechanical problems. It seems plausible that by the same method our schools, working under a guiding consciousness of our social relations, and thru the application of scientific knowledge, could educate us into a new humanism, into a true democratic mode of living together.

A Measuring Scale in Foods

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THE prevalent conception of a course in foods—that which is usually found in so many secondary and elementary schools—is best described by the term cooking. In order that this condition may not continue indefinitely, tests will be valuable if for no other reason than to suggest the broader and certainly more desirable subject-matter which should be included in this phase of home economics. However, there were other reasons for attempting the measuring scale than that of standardizing to some extent the material to be taught in foods.

Every principal and teacher of a junior and senior high school has the problem of classifying into more or less homogeneous groups the pupils who come from other schools with their varying amount of preparation in foods. With the assistance of a measuring scale, it would be possible to place in one section the pupils whose ability are closely similar and thus save the teacher from having to shift in her instruction from one grade of ability to another.

Every teacher knows what she means when she gives a pupil a grade mark of 90, but that 90 may not be at all comparable with that of the teacher in the other sections of foods nor in another school. Set standards of attainment, each having a score value, would make possible the comparison of the mark of a pupil in one class with that of a pupil in another class. And not only would it be possible to compare the attainments of pupils, but also classes in the same school and in different school systems. This comparison should be stimulating to both teachers and pupils.

Tests frequently given would enable the teacher to measure the efficiency of her teaching; to discover the degree to which her instruction has emphasized the attainments she desires; to be critical of her methods; and to indicate to her their effect upon the accomplishment of the pupils. They should enlighten her as to the pupils' ability to handle the subject-matter and their difficulties, the underlying causes of which might never be discovered in any other way. With this knowledge she should be able to correct her own and her pupils' weaknesses.

The first question to be decided in attempting the scale was, What grades should it cover? It is very well known that the grade in which food work is begun, the subject-matter taught, the methods of teaching, and standards of attainment vary with the locality and the preparation and inclination of the instructor. For this reason a scale to cover the subject-matter of any one grade would be impossible. It must be one that would measure ability thruout the elementary and secondary schools.

One of the objections to standardized tests is that they do away with flexibility of subject-matter, and make it impossible to meet the needs of the individual pupils in particular localities. Nevertheless, one cannot but feel that there is a certain body of fundamental material, certain abilities and facts to be acquired which should be expected in all foods teaching. These minimum essentials which should be common to all foods courses can be tested.

For instance, in a foods course you would expect such abilities as these: the ability to appreciate and understand the labor and cost involved in food manufacture and sale, the ability to discriminate in its selection and purchase, the ability to give it proper care after purchase, the ability to prepare it with the least waste as to its flavor and nutriment, and the ability to serve it properly. These abilities are merely suggestive of the content of a foods course. It is evident that such abilities can be acquired only thru learning certain facts, exercising certain judgments, and developing certain skills. Therefore before going further it was necessary to recognize and weigh these objectives of food study.

To make tests for these abilities, it was necessary to analyze them and to set down the specific things which must be learned or done in their acquisition. For example, in order to be discriminating when selecting and purchasing food, the child would have to have some knowledge of the composition of food and its relation to the needs of the body; of standard products and prices; of the manufacturing processes, marketing cost, and possible adulterations.

To determine the subject-matter that would be common to most of the courses in foods, six of the nine textbooks which were found by the University of Chicago survey to be used by 90 per cent of the teachers thruout the country were analyzed and the contents tabulated. The three not analyzed were either out-of-date or not sufficiently comprehensive to be worth including. Three other books which have been published since then were treated in the same manner. This subject-matter was discussed with several teachers of foods in the elementary and secondary schools, several university instructors in foods, and with one in vocational home-making. Articles on home economics in various educational magazines and a number of courses of studies were used as other sources of material.

The design of the test is a simple checking test, with the method of right or wrong scoring, covering material involving information and judgment. A skill test was not attempted; for it is very difficult to analyze the skill which enters into the preparation of a recipe and to evaluate the different constructive elements which go to make up the skill. This type of test in foods should surely come later.

After the preliminary test was made a group of instructors in foods answered all the exercises, and all those which were ambiguous or in which there was any difference of opinion as to the answer were thrown out. They were then given to about one hundred pupils of a junior and senior high school, and all which were found to be unscorable or otherwise unsatisfactory were eliminated. They were then arranged in order

of increasing difficulty to that particular group. This arrangement seemed rather disturbing, for it meant the shifting about of groups of questions with associated ideas and the associating of irrelevant questions.

To find out if this would be disturbing to the pupils, another set was made in which the questions were arranged in order of increasing difficulty within associated groups. These were given to a group of fifty children, twenty-five answering each set. To each set was attached a list of questions of identical nature and arrangement. By means of this control set, one group was found to be much abler than the other. By using the calibrator for smoothing out the differences in group ability, the first form, or that arrangement in order of increasing difficulty regardless of associated ideas, was found to be more readily answered than the other.

They are now arranged in that form and are being given to about five thousand pupils. The data obtained from the results will be used in standardizing them, the scale value being determined by the per cent of pupils failing superimposed on the normal curve of ability. This scale, of course, will be only tentative, being subject to revision as the tests are used and the data, thus obtained, used for rescaling.

It might be added that the tests are only tentative, for until the minimum essentials in foods have been determined by scientific methods and accepted and adopted by a large majority of home economics workers, any group of tests can cover only the material considered to be the minimum essentials in the judgment of a few individuals.

